00142601

Digitized with financial assistance from the
Government of Maharashtra
on 02 July, 2018

THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY—VOL. XVII.

REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1873-76

14601

UNDER THE COMMAND OF

CAPTAIN GEORGE S. NARES, R.N., F.R.S.

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

THE LATE

Sir C. WYVILLE THOMSON, Knt., F.R.S., &c.

REGIUS PROFESSOR OF NATURAL HISTORY IN THE UNIVERSITY OF EDINBURGH

DIRECTOR OF THE CIVILIAN SCIENTIFIC STAFF ON BOARD

AND NOW OF

JOHN MURRAY

ONE OF THE NATURALISTS OF THE EXPEDITION

ZOOLOGY—VOL. XVII.

CCK. 26

Published by Order of Her Majesty's Government

PRINTED FOR HER MAJESTY'S STATIONERY OFFICE

AND SOLD BY

LONDON :—EYRE & SPOTTISWOODE, EASTER HARDING STREET, FETTER LANE.

EDINBURGH :—ADAM & CHARLES BLACK.

DUBLIN :—HODGES, FIGGIS, & CO.

1886

Price Forty Shillings.

PRINTED BY NEILL AND COMPANY, EDINBURGH,
FOR HER MAJESTY'S STATIONERY OFFICE.

THE Editor of the Challenger Reports will be greatly obliged to Authors sending him copies of separate papers, or references to works, in which the Challenger discoveries are referred to, or the observations of the Expedition are discussed.

This will greatly facilitate the compilation of a complete Bibliography, and the discussion of the results of the Expedition, in the final Volume of the Series.

Letters and Papers should be addressed—

JOHN MURRAY,

CHALLENGER OFFICE,

32 QUEEN STREET,

EDINBURGH.

CONTENTS.

I.—Report on the Isopoda collected by H.M.S. Challenger during the years 1873–1876.—Second Part.

By Frank Evers Beddard, M.A. (Oxon), F.R.S.E., F.Z.S., Prosector to the Zoological Society of London.

(*The Manuscript was received in Instalments between the 3rd February and 8th November* 1886.)

II.—Report on the Brachyura collected by H.M.S. Challenger during the years 1873–1876.

By Edward J. Miers, F.Z.S., F.L.S., of the British (Natural History) Museum.

(*The Manuscript was received in Instalments between 1st April and 25th November* 1886.)

III.—Report on the Polyzoa collected by H.M.S. Challenger during the years 1873–1876.—Second Part.

By George Busk, F.R.S., V.P.L.S.

(*The Manuscript was received in Instalments between 19th June* 1886 *and 16th July* 1886.)

EDITORIAL NOTES.

THIS Volume contains Parts XLVIII., XLIX., and L. of the Zoological Series of Reports on the Scientific Results of the Expedition.

Part XLVIII. is the Second and concluding Part of the Report on the ISOPODA collected during the Expedition, by Frank Evers Beddard, Esq., M.A. (Oxon), Prosector to the Zoological Society of London.

The First Part of the Report was published in 1884 in Volume XI., Zoology, and forms Part XXXIII. of the Zoological Series of Reports.

Part XLIX. is a valuable Systematic Report on the BRACHYURA collected during the Expedition, by Edward J. Miers, Esq., F.L.S., formerly Assistant in the Zoological Department of the British Museum.

It is to be regretted that Mr. Miers' health did not permit him to revise the proofs of the greater part of the Report as it was passing through the press. Great care was, however, taken to render the text as correct as possible, and fortunately Mr. Miers has been able to look over the Report, and to point out a few errors, before the last sheets were passed for press.

Part L.—The First Part of the Report on the POLYZOA, treating of the CHEILOSTOMATA, by George Busk, Esq., F.R.S., was published in 1884 in Volume X., Zoology, forming Part XXX. of the Zoological Series of Reports. The present part forms the second and concluding portion of Mr. Busk's Report on the Polyzoa, and has a very special interest from being the last piece of scientific work accomplished by that distinguished veteran naturalist.

Mr. Busk, though in failing health during the last year of his life, yet struggled manfully amid many infirmities to complete this Report. The last instalment of the Manuscript was received by me on the 16th July last, and Mr. Busk had an opportunity of revising the proofs before his death, on the 10th August. A week or two later Miss Busk returned to me the whole Report for press.

JOHN MURRAY.

CHALLENGER OFFICE, 32 QUEEN STREET,
EDINBURGH, *6th December* 1886.

THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY.

REPORT on the Isopoda collected by H.M.S. Challenger during the Years 1873-76. By Frank Evers Beddard, M.A. (Oxon), F.R.S.E., F.Z.S., Prosector to the Zoological Society of London.

PART II.

PREFACE.

The first part of my Report on the Isopoda, which deals exclusively with the family Serolidæ, has already been published and forms Part XXXIII. of the series of Reports on the Zoology of the voyage. The present Report contains an account of the species belonging to the other families of Isopoda and completes the description of this group.

I have purposely refrained from giving any detailed description of species already known that were obtained by the Challenger, except in a few cases where it appeared to me that a further description would be of some use as an aid in distinguishing the species from closely allied forms. I have, however, in most cases referred to such species, especially when they occurred in a new locality or at a greater depth than they had been previously known to inhabit; such facts being of course important from the general point of view of the Geographical Distribution of the group.

The collection of Isopoda made during the voyage is very rich in new species and genera, more particularly, as might be expected, in the deep-water forms, of which no less than thirty-eight are new to science. Among the shallow-water species the

greater number of novelties were dredged off Kerguelen and the adjacent islands, the Isopod fauna of which has been hitherto comprised in a very meagre list consisting of only fifteen species; to this I am able to add fifteen new species.

In other parts of the world, with the exception of Australia, dredging in shallow-water proved to be not very productive as regards this group. A great number of species, particularly among the Sphæromidæ, were dredged along the southern and eastern shores of Australia, but most of these species prove to be identical with forms already described by Mr. Haswell. I have to acknowledge my indebtedness to Messrs. Chilton, Miers, and G. O. Sars, for sending me their papers dealing with Isopoda; also to Professor G. O. Sars for kindly forwarding to me drawings of Isopoda collected by him off the coasts of Norway, but only as yet briefly described; to the Rev. T. R. R. Stebbing for the loan of several species described by him, and finally to Mr. G. M. Thomson for a collection of Isopoda from New Zealand, which have proved to be of the greatest assistance in determining several points, which will be referred to in the course of the following pages.

DESCRIPTIONS OF GENERA AND SPECIES.

In the following descriptions I have followed the classification adopted by Professor G. O. Sars in his recently published account of the Crustacea collected by the Norwegian North Sea Expedition, which is as follows :—

Order ISOPODA.

Tribe I. ASELLOTA.

Family Asellidæ.
„ Munnopsidæ.

Tribe II. VALVIFERA.

Family Iodtheidæ.
„ Arcturidæ.

Tribe III. CHELIFERA.

Family Apseudidæ.
„ Tanaidæ.

Tribe IV. FLABELLIFERA.

Family Anceidæ.
„ Anthuridæ.
„ Cymothoidæ.
„ Serolidæ.
„ Sphæromidæ.

None of the new species collected by the Challenger are so divergent in structure as not to fit accurately into this system, which appears to me to be in the present state of our knowledge a very convenient one. The following is a complete list of the new species and genera arranged under the families to which they belong.[1]

Tribe I. ASELLOTA.

Family ASELLIDÆ.

Genus *Janira*.

1. *Janira abyssicola*.
2. „ *tristani*.

Genus *Stenetrium*.

3. *Stenetrium haswelli*.

Genus *Iolanthe*, F. E. B.

4. *Iolanthe acanthonotus*.

Genus *Jæropsis*.

5. *Jæropsis marionis*.

Genus *Trichopleon*.

6. *Trichopleon ramosum*.

Genus *Munna*.

7. *Munna maculata*.
8. „ *pallida*.

Genus *Pleurogonium*.

9. *Pleurogonium albidum*.
10. „ *serratum*.
11. „ *minutum*.

Genus *Neasellus*, F. E. B.

12. *Neasellus kerguelenensis*.

[1] I have of course omitted the Serolidæ, for which see Zool. Chall. Exp., part xxxiii.

Genus *Astrurus*, F. E. B.

13. *Astrurus crucicauda.*

Genus *Ischnosoma.*

14. *Ischnosoma spinosum.*
15. „ *bacillus.*
16. „ *bacilloides.*

Genus *Acanthomunna*, F. E. B.

17. *Acanthomunna proteus.*

Family MUNNOPSIDÆ.

Genus *Munnopsis.*

18. *Munnopsis gracilis.*
19. „ *australis.*
20. „ *latifrons.*

Genus *Eurycope.*

21. *Eurycope sarsii.*
22. „ *novæ-zelandiæ.*
23. „ *fragilis.*
24. „ *atlantica.*
25. „ sp. ?
26. „ *spinosa.*
27. „ *intermedia.*
28. „ *pellucida.*
29. „ *abyssicola.*

Genus *Ilyarachna.*

30. *Ilyarachna quadrispinosa.*

Genus *Acanthocope*, F. E. B.

31. *Acanthocope spinicauda.*
32. „ *acutispina.*

Tribe II. VALVIFERA.

Family ARCTURIDÆ.

Genus *Arcturus.*

33. *Arcturus glacialis.*
34. „ *spinosus.*
35. „ *anna.*
36. „ *cornutus.*
37. „ *spinifrons.*
38. „ *purpureus.*
39. „ *brunneus.*
40. „ *abyssicola.*
41. „ *myops.*
42. „ *studeri.*
43. „ *oculatus.*
44. „ *americanus.*
45. „ *stebbingi.*

Genus *Astacilla.*

46. *Astacilla marionensis.*

Tribe III. CHELIFERA.

Family APSEUDIDÆ.

Genus *Apseudes.*

47. *Apseudes antarctica.*

Genus *Typhlapseudes*, F. E. B.

48. *Typhlapseudes curtus.*

Genus *Leiopus*, F. E. B.

49. *Leiopus leptodactylus.*

Family TANAIDÆ.

Genus *Tanais.*

50. *Tanais hirsutus.*

Genus *Paratanais.*

51. *Paratanais dimorphus.*

Genus *Typhlotanais.*

52. *Typhlotanais kerguelenensis.*
53. „ *brachyurus.*

Genus *Neotanais*, F. E. B.

54. *Neotanais americanus.*

Genus *Bathytanais*, F. E. B.

55. *Bathytanais bathybrotes.*

Genus *Leptognathia.*

56. *Leptognathia australis.*

Tribe IV. FLABELLIFERA.

Family ANCEIDÆ.

Genus *Anceus.*

57. *Anceus bathybius.*
58. „ *latidens.*
59. „ *gigas.*
60. „ *tuberculosus.*

Family SPHÆROMIDÆ.

Genus *Cymodocea.*

61. *Cymodocea abyssorum.*

Family CYMOTHOIDÆ.

Genus *Anuropus*, F. E. B.

62. *Anuropus branchiatus.*

Family ANTHURIDÆ.

Genus *Paranthura.*

63. *Paranthura chiltoni.*
64. „ *kerguelenensis.*

Tribe I. ASELLOTA.

The group Asellota may be divided as follows :—

A. Posterior thoracic appendages similar in structure to anterior.

1. ASELLIDÆ.

B. Posterior thoracic appendages natatory with dilated penultimate and antipenultimate joints.

2. MUNNOPSIDÆ.

Family ASELLIDÆ.

Janira, Leach.

Janira, Leach, Edin. Encycl., vol. vii. p. 434.
Henopomus, Krøyer, Naturhist. Tidsskr., Rk. 2, Bd. ii. p. 380, 1849.
Oniscoda, Latreille, Règne Animal, vol. iv. p. 141.
Asellodes, Stimpson, Marine Invert. Grand Manan, 1853, p. 41.

This genus does not differ very much from *Jæra*. The main points of difference are in the antennæ; the first pair of antennæ have a much longer flagellum and the second pair are distinguished by the possession of a rudimentary exopodite in the form of a setose scale attached to the outer margin of the third joint. As a general rule the first pair of thoracic limbs are prehensile in character, but according to G. O. Sars this is not the case with the female of *Janira breviremis*;[1] the uropoda are as a rule longer and better developed than in *Jæra*. The mandibular palp is stated by Westwood and Spence Bate[2] to be absent, though with a certain reservation, in *Janira maculosa;* it is present in a new species to be presently described (*Janira abyssicola*) which in other respects presents a structure characteristically like that of *Janira*.[3] In the mean time it is evidently advisable to retain the genus *Janira* as distinct from *Jæra* on account of the different form of the antennæ, which is undoubtedly the only well marked character that can be made use of.

One species of *Janira* that will presently be described is interesting on account of its coming from deep water, 1350 fathoms; this species, which I have named *Janira abyssicola*, is not by any means unlike the typical forms of the genus, only differing from them in the total absence of eyes. This difference, evidently resulting from a difference of habitat, is not to my mind sufficient to distinguish this species generically, though in many instances, *e.g.*, *Pleurogonium*, the absence of eyes does imply a generic distinction.

[1] *Vidensk. Selsk. Forhandl.*, 1882, p. 64.
[2] British Sessile-eyed Crustacea, vol. ii. p. 336.
[3] Through the kindness of the Rev. T. R. R. Stebbing I have been able to examine a specimen of *Janira maculosa*, and find that it has a distinct three-pointed palp.

Janira abyssicola, F. E. Beddard.

Janira abyssicola, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 105.

The present species is represented by a single female example from the great depth of 1350 fathoms, off Kandavu, Fiji. It is one of the few species of the genus *Janira* which are known to inhabit deep-water.

The single specimen is mounted in Canada balsam, and owing to its great transparency is somewhat difficult to describe accurately; for the same reason I have not figured the species. The head has a rounded anterior margin, and the eyes are completely absent; the first three segments of the thorax are of about equal length; the next two are very much shorter, about one-half the length of the anterior segments; the sixth segment has an antero-posterior diameter about equal to that of either of the first segments, while the seventh and last segment of the thorax is longer than any. The margins of the thoracic segments are rounded and fringed with short stiff hairs. The abdominal shield is rather longer than broad, and its margin is similarly furnished with hairs.

The *antennules* have the form characteristic of the genus *Janira*, but I am unable to give any details.

In the *antennæ* the third joint has a long scale attached to its outer side, which projects beyond the short fourth joint; the fifth joint is long and stout;[1] the distal joint of the peduncle is longer but rather more slender; the flagellum is of a very great length, much longer than the peduncle; the whole appendage is longer than the body of the animal.

The *mandibles* are furnished with a palp.

The *thoracic limbs* are all similar to one another.

The *uropoda* are long, as long as the abdominal shield; they consist of a short broad basal piece with two long and narrow rami; of these the inner are the stoutest as well as the longest; each has a tuft of longish hairs at its extremity.

Station 175, off Kandavu, Fiji, August 12, 1874; lat. 19° 2′ S., long. 177° 10′ E.; depth, 1350 fathoms; Globigerina ooze; bottom temperature, 36° F.

Janira tristani, F. E. Beddard (Pl. II. figs. 2–5).

Janira tristani, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 105.

Two specimens of this species were dredged off Tristan da Cunha in 100 to 150 fathoms.

I regard the species as belonging to the genus *Janira* with some hesitation as both specimens are imperfect, certain appendages which would largely aid in identifying the genus being missing.

The length is 5 mm.

[1] The only other species which ranges into water deeper than 100 fathoms is *Janira laciniata*, dredged by Sars in the Northern Ocean from a depth of 400 fathoms (see G. O. Sars, *Forhandl. Vidensk. Selsk.*, 1872, p. 92).

The head is broader than long, with very large laterally placed eyes; there is a long spatulate rostrum which projects beyond the end of the second joint of the antennules; on either side of this the anterior margin of the head is depressed for the articulation of the antennules, the antero-lateral margins being again salient, though not projecting so far as the rostrum. The head as well as the rest of the body is very convex.

The width of the body gradually increases up to the third segment of the thorax, thence onwards it does not greatly diminish, so that the body has a cylindrical elongate form.

The first two segments of the thorax are about equal in length; the three succeeding segments progressively diminish in length; the two last segments are again rather longer. The first four have their antero-lateral margin prolonged into a truncated process and the postero-lateral margin also; the margins of all the segments as well as of the abdominal shield are fringed with scattered hairs. The epimera of all the thoracic segments, with the exception of the first, are visible on a dorsal view; in the second, third, and fourth segments the epimera are bilobed (see fig. 2), in the remaining segments they are unilobate.

The abdominal shield is subpentagonal and terminates in a short blunt process.

The *antennules* (fig. 4) have a long flagellum composed of a considerable number of joints; the peduncle consists of four joints; the first is stout and rounded, the second shorter and more slender, the third of about the same length as the second but more slender, the fourth very small.

The *antennæ* are broken off at the third joint in both specimens; the third joint is short, but longer than the two preceding; it is furnished with an articulated scale on the outer side (see fig. 5).

The *mandible* has a three jointed palp.

The *thoracic appendages* (fig. 3) are all similar to each other; the two first joints are stout and rather short, the third is shorter, and the fourth is as stout and of about the same length as the first two; the terminal joint of the limb is very short and biunguiculate.

The under surface of the abdomen (in the female) is entirely covered by the convex operculum.

The *uropoda* are defective, or may possibly be wanting, as there was no trace of them in either specimen.

This species agrees with *Jæra* in the general form of the body, and in the non-prehensile character of the first thoracic appendages.

On the other hand, it agrees with *Janira* in the multiarticulate flagellum of the antennules, and in the presence of a rudimentary exopodite to the antennæ.

It would be no escape from the difficulty to assign this species to the genus *Ianthe*, since the latter appears to be hardly distinguished from *Jæra*, except by the great length of the uropoda, which are like those of *Janira;* and these appendages are, as has

been mentioned, wanting in *Janira tristani;* the possibility, however, that they are really abortive must be borne in mind. I have indicated them in the figure as they were in two small specimens (1 mm. in length) from the same locality, which may possibly belong to the same species.

Station 135c, off Nightingale Island, Tristan da Cunha, October 17, 1873; lat. 37° 25′ 30″ S., long. 12° 28′ 30″ W.; 100 to 150 fathoms.

Stenetrium, Haswell.

Stenetrium, W. A. Haswell, Proc. Linn. Soc. N.S.W., vol. v. p. 478.

Mr. Haswell has described an Isopod which he regards as the type of a new genus, *Stenetrium*, from Sydney Harbour; his description refers to a single male example.

A specimen which I describe here appears to be another representative of this same genus but to belong to a distinct species from that described by Haswell; I refer it to his genus on account of the elongate flattened form of the body which is of uniform diameter throughout, the narrow obliquely placed eyes, the short biramose uropoda, and the large chelæ of the male. Mr. Haswell at first assigned this genus to the Tanaidæ, and it appears in his catalogue of Australian Crustacea (p. 308) as the type of a new subfamily, Stenetrinæ. More lately[1] Mr. Haswell dissents from his former conclusion and refers *Stenetrium* to the Asellidæ; with this conclusion I entirely agree.

In the Challenger specimen the posterior appendages of the thorax are in every case broken off and lost, and as the general shape of the body is decidedly unlike that of the Asellidæ but much more like that of certain Munnopsidæ, particularly *Desmosoma*,[2] I was at first inclined to assign the species to the Munnopsidæ. A careful comparison with Haswell's figures[3] of his species appears to me to show that my own species is referable to Haswell's genus *Stenetrium*, which is distinctly an Asellid and not a Munnopsid.

The genus may perhaps be regarded, like *Macrostylis* and *Ischnosoma*, as in certain respects transitional between the more typical Asellidæ and the Munnopsidæ.

The occurrence of an Australian shallow-water genus in deep water, off the shores of South America, is the more interesting as the two species are but little different.

The characters of *Stenetrium haswelli* necessitate a statement of the generic definition, which is as follows:—

"Body dorso-ventrally compressed; abdomen short with all the segments fused into a single piece. Head with a short rostrum; segments of the thorax subequal. Antennæ inserted on to the anterior margin of the head, internal pair short, external pair long; both with well developed flagellum; outer antennæ with a movable joint attached to third

[1] *Proc. Linn. Soc. N.S.W.*, vol. ix. p. 1010.

[2] *Desmosoma* is one of those species of which Professor Sars has kindly sent me a drawing in order to compare with those collected by the Challenger; its general appearance, apart from the fact that it has no eyes, is strikingly like that of *Stenetrium haswelli*.

[3] *Proc. Linn. Soc. N.S.W.*, vol. ix. pl. li.

joint of peduncle. Mandibles provided with a palp. Maxillipedes expanded, operculiform; first pair of thoracic limbs (in the male only?) with a large prehensile manus, the penultimate joint swollen and subtriangular in form, with a row of serrate spines along the anterior margin which correspond to a row of similar spines upon the last joint; remaining pairs of limbs slender, ambulatory, with a double terminal claw. Caudal appendages biramous, inserted on the border of the shield-like abdomen near the extremity."

The genus *Stenetrium* is closely allied to *Ianthe*, *Asellus*, *Jæra* and *Janira*; it agrees with all these genera in the equality of size of the thoracic segments, differing in this respect from such genera as *Pleurogonium*, *Ischnosoma*, &c.

The genus has, however, been rightly distinguished by Haswell. The main points in which it differs from any of the above mentioned genera are as follows:—from *Asellus* it differs in the presence of two terminal claws on the ambulatory limbs, and in the fact that the male has only one pair of thoracic appendages modified into a prehensile hand instead of two; also, the existence of two free abdominal segments in *Asellus* is a character not found in *Stenetrium*. All the other genera mentioned agree with *Stenetrium* in having two terminal claws, while *Ianthe* and *Janira* show a still farther point of resemblance in the presence of a rudimentary exopodite on the antennæ;[1] *Stenetrium* is distinguished from *Janira*, by the powerful first thoracic limbs of the male, a character which does not appear to be found to so marked an extent in any other Isopod. From *Iolanthe* the latter characteristic sufficiently distinguishes *Stenetrium*, as well as the comparatively flattened depressed body and the form of the abdominal appendages (compare Pl. IV. fig. 13, with Bovallius, *loc. cit.*, pl. iii. figs. 29, 30, 32, 33, 34).

Of this genus four species are now known. Two species, *Stenetrium armatum* and *Stenetrium inerme*, have been described by Haswell from Sydney, Australia, in shallow water; a third species was dredged by Chilton in Lyttelton Harbour, New Zealand, and named by him *Stenetrium fractum;* the fourth species, *Stenetrium haswelli*, will be described in the following pages. It is the only one of the genus known from deep water, and it bears out one generalisation that has been arrived at from a study of the deep sea fauna, viz., that the inhabitants of deep water are larger than their shallow-water allies.

Stenetrium haswelli, F. E. Beddard (Pl. IV. figs. 1–8).

Stenetrium haswelli, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 103.

This species, as already mentioned, is represented by a single example, dredged in 600 fathoms, off the east coast of South America.

[1] This fact has been pointed out by J. E. V. Boas (*Morphol. Jahrb.*, Bd. viii. p. 493 *note*, 1883) in the case of *Janira;* Bovallius (*Bihang til Svensk. Akad. Handl.*, Bd. vi., No. 4, pl. i. fig. 7) has depicted the articulated squame of *Ianthe speciosa*, while Mr. Chilton has noted and figured (*loc. cit.*, pl. xviii. fig. 3*b*), the same structure in *Stenetrium fractum*.

The specimen is a male and measures 16 mm. in length.

The body is everywhere of the same approximate breadth, and is therefore somewhat oblong in shape.

The head is of a smaller diameter than the thoracic segments, it is prolonged between the antennæ into a rostrum, the peculiar shape of which can be understood by an inspection of fig. 1; on either side of this the anterior margin of the head is somewhat curved and projects as a short process to the outside of the insertion of the antennules, the lateral regions of the head are prolonged into a rhomboidal area, the apex of which is directed forwards.

All the segments of the thorax are pretty much of equal length and breadth; the first three segments are slightly crescentic in form, the convex margin being directed forwards; the fourth segment is as nearly as possible straight; the succeeding segments are concave backwards, the depth of the concavity increasing progressively.

The dorsal surface of these segments is perfectly smooth and rather flattened. The lateral margin of the first thoracic segment is prolonged into a curved and somewhat forwardly directed triangular spiny process, the base of which occupies as it were the whole of the lateral margin of the segment; in the second segment there is a very narrow antero-lateral spiny process; the two following segments are similar save that the antero-lateral process is somewhat stouter, and there is also a short postero-lateral process between which the margin of the segment is perfectly straight. In the fifth segment the antero-lateral process becomes much wider, occupying nearly the whole of the lateral margin; in the two remaining segments the lateral process is broad and as wide as the segment itself. The epimera absent in the first segment are elsewhere short; in the second, third, and fourth segments the epimera are bilobed processes projecting outwards from the middle of the lateral margin of the segments; in the fifth, sixth, and seventh segments the free margin of the epimera is rounded, and these structures come to lie at the postero-lateral margin of their segment, becoming also gradually reduced in size in the successive segments.

The caudal shield is about as long as the three last segments of the thorax; it is subquadrangular in outline; its margins, as well as those of the thoracic segments generally, are beset here and there with fine long unbranched hairs as are also the margins of the thoracic segments.

The *eyes* have the peculiar form that is characteristic of the genus; they occupy a narrow oblong area which is set nearly transversely but also somewhat obliquely to the longitudinal axis of the body.

The *antennules* (fig. 2) are made up of four basal joints and a long flagellum, longer than the peduncle; the proximal joint of the antennules is much thicker than the two succeeding ones; of these two the more distal is the longer, the fourth is very short indeed; the proximal portion of the flagellum is not jointed.

The *antennæ* are unfortunately broken off at the fourth joint; the three proximal joints are very short, the third being the longest; this latter bears on the outer side an articulated scale (figs. 3 and 5), which appears to me in all probability to have the significance of an exopodite. The shape of this scale is rather peculiar; it is suboval and folded in the middle line, the margins are beset here and there with long delicate hairs, and the whole structure has thus very much the appearance of a leaf of *Dionæa muscipula*.

The *mandible* has the apex divided into two principal lobes and then again into a number of tooth-like processes; beneath is a closely set tuft of peculiar serrate spines, at right angles to the longer axis of the mandible and parallel to the molar process, which is strong and well developed. The palp is long and three-jointed; the distal joint is oval and flattened and furnished along one edge with a closely set row of rigid hairs, which do not extend quite as far as the articulation of this joint with the preceding; the middle joint is long and stouter at its basal portion, distally it is furnished with a row of hairs like those upon the third joint, and also with two strong spines serrate along one margin.

The *maxillæ* of the first pair consist as usual of two pieces, the upper being the longer and stouter of the two; both are furnished along the cutting edge with numerous slender hairs and stoutish spines; some of these latter are serrate on the upper lobe of the maxilla.

The second pair of *maxillæ* I have not seen.

The *maxillipedes* are not in any way remarkable in their structure; the inner margin of the stipes is provided for a small portion of its extent with a series of round bodies articulated by a narrow stalk, in which no structure could be discerned; they no doubt correspond to the sensory (?) organs having a similar location on the maxillipedes of many Munnopsidæ; the upper extremity of the stipes is truncated and beset with short stiff hairs; the palp is five-jointed, and does not project much beyond the end of the stipes; its joints are fringed along the inner margin with long hairs; the first three joints are broad, the two distal joints muchnarrower.

The *first pair of ambulatory limbs* are extraordinarily long and are modified to form a prehensile hand, the length of the limb, which is figured on Pl. IV. fig. 4, is not much less than that of the body itself. The proximal joint is long and narrow; the three following joints grow shorter, and at the same time wider, towards the extremity of the limb; the outer side of each is prolonged considerably beyond the articulation of the succeeding joint; these joints are abundantly furnished with long slender unbranched hairs; the penultimate joint is greatly swollen and three-sided, the inner and outer margins are convex and beset like the preceding joints with fine slender hairs; the third side is almost straight; at its junction with the inner margin of the limb is a single stout spine; and along the edge is a row of serrate spines, below which are a few fine slender hairs. The distal joint of the limb is short and curved, and of about the same length as

the side of the penultimate joint, which it closely fits; it terminates in a stout spine like that which bounds the inner edge of the penultimate joint, and its inner edge is furnished with serrate spines similar to those upon the penultimate joint.

The other thoracic limbs are slender and small in comparison with the first pair, but as only one of them, the third on the right side, was preserved, it is impossible to speak with certainty. That the specimen is a male is also evident from the condition of the abdominal operculum and the second pair of abdominal appendages.

The *operculum* or first pair of abdominal appendages is displayed in fig. 6 of Pl. IV. Each appendage consists of an oval plate, flattened but convex ventrally, with a straight inner and a curved outer margin; the outer margin of each is fringed with a row of simple hairs which gradually increase in length towards the apex of the limb.

Beneath the operculum are a pair of remarkable appendages, which no doubt serve the function of a penis; they are displayed in fig. 7, but as I have only had one specimen of this species at my disposal I am unable to say whether that figure represents the whole of the appendage, or whether any portion has been detached. Each of these appendages consists of a strong basal joint which is shaped somewhat like a joiner's "square;" the nearly straight outer margin is fringed with a number of short simple hairs; and near to the apex of the limb is given off what apparently corresponds to the endopodite. This consists of two elongated joints which are articulated so as to lie almost parallel with each other and with the basipodite; at the apex of the basipodite are articulated one or two small joints which may represent the exopodite.

Then follow three pairs of lamellar branchial appendages; these are covered over and protected by the exopodites of the first pair, which are stout and much calcified; these are traversed by an oblique suture; the outer round margin, and to a certain extent also the inner straight margin, are fringed with short simple hairs; the endopodite of this limb is the first branchial organ.

The fourth pair of abdominal appendages consists of endopodite and exopodite, the fifth pair of one ramus only; in every case the shape of these limbs is the same—subtriangular with a rounded outer and a straight inner margin; the apex of each is beset with a tuft of long hairs which appear to be plumose.

The terminal pair of abdominal appendages or *uropoda* are displayed in fig. 8 of Pl. IV. They are biramose, the endopodite and exopodite being subequal in size and beset with numerous longish hairs.

This species differs from those already described by Haswell and Chilton in the following points:—

From *Stenetrium fractum*, Chilton,[1] in the greater length of the flagellum of the first

[1] Mr. Chilton's description of the species *Stenetrium fractum* (*Trans. New Zealand Soc.*, vol. xvi. p. 251) is unfortunately rather brief owing to the imperfect condition of the specimen examined by him; hence the points of difference between his species and mine which I have been able to cite are necessarily rather meagre, but I think quite sufficient to discriminate between the two.

pair of antennæ, which is composed of a considerably greater number of joints than in that species; in the form of the first pair of ambulatory limbs, the antipenultimate joint being prolonged beyond the point of articulation of the succeeding joint in *Stenetrium haswelli*, and not so prolonged in *Stenetrium fractum*.

From *Stenetrium armatum* also in the greater length of the flagellum of the antennules, which are stated by Haswell to possess from eight to twelve joints only in that species; in that species also the penultimate joint of the cheliform appendages "is defined by a long acute spine, and armed in addition with a bifid denticle situated about its middle;" there appears to be no trace of this latter in *Stenetrium haswelli*. In his description of *Stenetrium armatum* Haswell makes no mention of a molar process to the mandible, which is certainly present in *Stenetrium haswelli*.

From *Stenetrium inerme*, Haswell's second species, the present is easily to be distinguished by the form of the eyes, which have the narrow oblong form characteristic of the genus; in *Stenetrium inerme* the eyes are said to be rounded; in the antennules of *Stenetrium inerme* the third joint of the peduncle is scarcely distinguishable from the flagellum; in *Stenetrium haswelli* there is no possibility of confounding the third joint of the peduncle with the succeeding flagellum, the joints of which are much shorter as well as narrower.

Station 320, off the Rio de la Plata, February 14, 1876; lat. 37° 17′ S., long. 53° 52′ W.; 600 fathoms; bottom temperature, 37°·2 F.; green sand.

Ianthe, Bovallius.

Ianthe, Bovallius, Bihang til Svensk. Vetensk. Akad., Bd. vi., No. 4.
Ianthe, Studer, Isopoden gesammelt, &c., Abhandl. d. k. Akad. d. Wiss. Berlin, 1883, p. 10 (of memoir).

This genus was founded by Bovallius to include a small species of Isopod from the Arctic Ocean, which with the same general shape as *Janira*, differs from it in the following particulars:—in the great convexity of the body, in the small and distant eyes, the want of an articulated scale on the peduncles of the antennæ, and in the presence of a well developed mandibular palp. In other respects the species *Ianthe speciosa* agrees very closely with *Janira*, the uropoda are large and biramose as in that genus, and both pairs of antennary organs are furnished with a long flagellum. These last named particulars, as also the modification of the first pair of thoracic limbs into a prehensile appendage, serve to separate *Ianthe* from *Jæra*. The general aspect of *Ianthe speciosa*, judging from Bovallius's beautiful illustration, is very unlike the typical form of the genus *Janira*, as represented in such species as *Janira maculosa*, *Janira breviremis*, Sars, and others; but Harger has recently described and figured a new species clearly referable to the genus *Janira*, which bears a very striking resemblance to *Ianthe speciosa*. It has the same double row of spines down the back, a long rostrum, and in both species

the caudal shield is excavated posteriorly, the postero-lateral margins being prolonged beyond the articulation of the uropoda, but in *Ianthe* the excavation is deeper.

Certain species of *Janira* already described by myself in the present Report (p. 6) have a mandibular palp, and the same structure is present in *Janira maculosa*. I cannot therefore admit that the presence or absence of a palp to the mandible is any safe criterion of generic distinction. The only structural feature in which *Ianthe* differs from *Janira* is in the want of an articulated scale—the rudimentary exopodite—upon the antennæ. In pl. i. fig. 7 of his Memoir, Bovallius figures the antenna of *Ianthe speciosa*, and it may be seen from that figure, as well as from the description, that the third joint of the peduncle is furnished with a stout spine on the outer side in a position exactly corresponding with the exopodite. In the figure this spine is represented as being articulated. and in a species presently to be described, I shall refer to a similar spine having an exactly similar position, being fixed to the third joint of the peduncle, and separated from it by a joint. In any case it appears to me to be a matter of impossibility to distinguish exactly between such a spine and the articulated scale of *Janira* or *Stenetrium*.

A second species of Isopod has been referred to this same genus by Studer, in his account of the Isopoda collected by the German exploring vessel "Gazelle." Studer's description of this form rests upon the examination of a single imperfect specimen from Kerguelen. The Challenger during its long stay at Kerguelen obtained a very large number of specimens of this Isopod, which was named by Studer *Ianthe bovallii*. I cannot however, agree with Dr. Studer in regarding this species as closely allied to Bovallius's species. It certainly agrees with it in the general shape of the body even more than is apparent from Studer's figures, since there are two rows of blunt tubercles along the back instead of only a single row as represented by this author. The antennary organs are very different; the first pair of these or the antennules are much more like those of *Jæra* in the shortness of the flagellum, which consists in my specimen of only four or five joints, whereas in *Ianthe speciosa*, as in *Janira*, the flagellum is long: this difference is noted in the figure by Studer. The flagellum of the antenna as correctly figured by Studer is proportionally short; with regard to the rudimentary exopodite there is a conical spine on the third joint which seems to me to be the equivalent of this structure.

The most marked difference, however, apart from the antennules, is the form of the uropoda, which were wanting in Studer's specimen. These are displayed in fig. 8 of Pl. V.; the basal joint is extremely long, the two distal joints short, the endopodite being larger than the exopodite; it has been already mentioned that in *Ianthe speciosa* the uropoda are precisely similar to those of *Janira* in that the two rami are subequal to each other and to the basal joint. Again the first thoracic appendages in neither sex of *Ianthe bovallii* are modified into a prehensile hand. In view of these differences it is in my opinion necessary to distinguish generically *Ianthe bovallii* from *Ianthe speciosa*, and whether there is or is not (in my opinion not) any necessity for a new generic term

to be applied to Bovallius's *Ianthe speciosa*, it is clear that *Ianthe bovallii* cannot be safely referred to any existing genus. I therefore propose to term this genus—

Ianthopsis, n. gen.

Body elongate and having the same general shape as in *Jæra* or *Janira*. Head prolonged anteriorly into a short rostrum. Lateral regions of head as of thoracic segments prolonged into processes; those of the head and the first segment of the thorax, as well as of the three terminal segments of the thorax, are simple; in the second, third, and fourth segments of the thorax the processes are bifid. Abdominal segments fused with deeply serrate margins. Antennules with a very short flagellum, consisting of four or five joints; antennæ three times the length of antennules, with a long flagellum equal in length to the two terminal joints of the peduncle; third joint of the peduncle with a spine which represents the rudimentary exopodite (?). Mandibles furnished with a palp. Thoracic appendages all similar to each other in both sexes, biunguiculate uropoda with a long basal joint and two short rami, the inner longer than the outer.

I have already indicated the differences between this genus and *Janira*, from which it is sufficiently distinguished; it is also allied to Sars genus *Acanthoniscus*, from which, however, it differs by the presence of eyes, by the rudimentary flagellum of the antennules, and by the biunguiculate thoracic appendages (Pl. V. fig. 5).

Iolanthe, F. E. Beddard.

Iolanthe, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 104.

A large Isopod, dredged to the south of Kerguelen in 1675 fathoms, I regard as the type of a new genus. It may be defined as follows :—

Definition.—Head as wide as the first thoracic segment, terminating in front in a long upturned spiny rostrum; eyes absent. Lateral margins of head and of thoracic segments prolonged into long curved spiny processes, which are single in the first and last three segments of the thorax, but supplemented by an additional postero-lateral shorter process in the head and in the middle segments of the thorax. Thoracic segments with a single long median dorsal spine. Abdominal segments fused into a rounded shield with three pairs of shorter lateral spines. Antennules half the length of antennæ, with a long multiarticulate flagellum; antennæ with an articulated spine on the third joint representing the exopodite; (?) mandibles with a palp. Thoracic appendages (in female at least) all similar to each other, biunguiculate. Uropoda as long as the abdominal shield, with an elongate curved basal joint and two extremely short rami, of which the inner is the larger.

Remarks.—This genus is evidently most nearly allied to *Ianthopsis* and *Acanthoniscus*, and it may be that I am wrong in distinguishing it. It differs, however, from the latter in a number of particulars, notably in the biunguiculate thoracic appendages; these appendages in *Acanthoniscus* terminate in a single claw; as this character undoubtedly distinguishes other genera, it is perhaps permissible to make use of it to distinguish *Iolanthe* from *Acanthoniscus*, although the two forms show very great resemblance, particularly in the shape of the uropoda. From *Ianthopsis* the present genus differs in the absence of eyes and in the long straight epimeral spines as well as in the form of the antennules with their long flagellum.

Iolanthe acanthonotus, F. E. Beddard (Pl. IV. figs. 9–14; Pl. V. figs. 1–4).

Iolanthe acanthonotus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 104.

This species is represented by a single female specimen, dredged to the South of Kerguelen in 1675 fathoms.

It is an extremely large species compared with its allies, measuring 24 mm. in length.

This species is remarkable for the immense length of the spiniform lateral prolongations of the thoracic segments, which is an exaggeration of the characters found in *Ianthopsis bovallii*. In other respects it presents a very close agreement with that species.

The head is as wide as the succeeding segment of the thorax, its margins are prolonged on either side into two spines, of which the anterior is very much the longer; the central region of the head is very convex, while the curved anterior margin is prolonged in the middle line into a long spine, which is directed forwards and upwards. There is no trace of eyes.

The first three segments of the thorax are concave anteriorly and convex posteriorly; the fourth is almost straight, the three posterior segments being concave posteriorly, the amount of the curvature of the segments increasing progressively. The antero-posterior diameter of all the thoracic segments is about equal. In the dorsal median line of each of the thoracic segments is a stout and long vertically directed spine; in the four anterior segments the spine arises near to the anterior margin of the segment; in the three posterior it arises near to the posterior margin. The general surface of the body, including the dorsal and lateral spines, is sparsely covered with long hairs.

The first segment of the thorax as already mentioned is no wider than the head, but the remaining segments of this region are rather wider and subequal. The curvature of the segments, however, causes the outline of the body to be more or less oval, though the posterior segments are in reality fully as wide, measured from tip to tip, as the anterior segments, or even wider. The lateral margins of the first thoracic segment are prolonged on either side into a longish spine, which is distinctly shorter than the anterior of the two lateral spines of the head.

Each of the three succeeding segments has a pair of lateral spines on either side, the anterior being much the longer and curved; in the remaining segments of the thorax only the anterior spine is present, the posterior having become obsolete. The length of the lateral spines increases slightly in the successive segments, being therefore longer in the seventh segment of the thorax than in any of the others.

The spines upon the thorax do not correspond to the epimera, which are very small and lie beneath them; in the three posterior segments the epimera are each furnished with a minute spine.

The segments of the abdomen are fused into a single piece which is almost circular in form; on either side are three spines much shorter than the lateral spines of the thorax; and on either side of the blunt termination of the abdominal shield are two minute tubercles, between which the uropoda are articulated.

The *antennules* (Pl. IV. fig. 10) are rather less than half the length of the antennæ; they measure about 6 mm.

The basal joint is stout and short and somewhat curved; the second is the longest and is much more slender; the third and fourth are very short, the fourth (Pl. V. fig. 3) being extremely minute. The flagellum is about as long as the three distal joints of the peduncle; it is composed of twenty-four joints, the first being very long, and about equal to the next four.

The *antennæ* (Pl. V. fig. 2) measure 13 mm. in length; the flagellum is nearly as long as the peduncle. The two basal joints of the peduncle are very short; the second has a long, spiny process on the outer side; the third is rather longer and has a long spine which differs from that upon the second in being articulated; it probably corresponds to a rudimentary exopodite; the fourth joint of the peduncle is very much shorter again, while the two distal joints are elongated and enlarged.

The *mandibles* are provided with a palp.

The first pair of *maxillæ* are shown in fig. 1 of Pl. V.; there is nothing remarkable in the form of these appendages.

The second pair of *maxillæ* are shown in fig. 4 of the same plate.

The apex of the larger lobe is furnished with four or five stout serrate spines, the middle lobe having three long spines, and the third lobe also three such spines which are not serrate.

The *maxillipedes* (Pl. IV. fig. 11) have a very long and straight stipes; just opposite to the articulation of the palp are five or six sensory processes. The palp is five-jointed; the second joint is the widest and at the same time the longest; the terminal joints are short and narrow.

The *thoracic appendages* are all similar to each other and terminate in two claws (Pl. IV. fig. 12) as in allied genera.

The specimen being a female, the abdominal appendages are covered by a large operculum which is traversed by three longitudinal ridges, one median and two lateral.

The *uropoda* (Pl. IV. figs. 13, 14) are rather peculiar in shape, and recall those of *Ianthopsis bovallii;* the distal joint is extremely long and curved, both its margins are furnished with numerous long simple hairs; the endopodite is proportionately very short, though considerably larger than the minute exopodite.

Station 153, in vicinity of the Antarctic Ice, February 14, 1874; lat. 65° 42′ S., long. 79° 49′ E.; depth, 1675 fathoms; bottom, blue mud.

Jæra, Leach.

Jæra, Leach, Edin. Encycl., vol. vii. p. 434.
Jæridina, Milne-Edwards, Hist. Nat. des Crust., vol. vii. p. 150.
Oniscus, Montagu, MSS.
Asellus, Packard, Mem. Bost. Soc. Nat. Hist., vol. i. 1867, p. 296.

Milne-Edwards in his Histoire naturelle des Crustacés [1] separated the species *Jæra nordmanni* as a distinct genus under the name of *Jæridina*, but, as has been pointed out by Westwood and Spence Bate,[2] the distinction between the two genera, viz., the form of the abdominal operculum, is in reality only a sexual difference, and the name *Jæra* must therefore be retained as having the priority. Several species of the genus have been described, but many of them rest on insufficient data, and it is a difficult matter therefore to decide how many species should be admitted. As well-characterised species may be mentioned, *Jæra albifrons* and *Jæra nordmanni*, the differences between which have been clearly pointed out by the Rev. T. R. R. Stebbing.[3] *Jæra wakishiana* of Spence Bate [4] appears to be perfectly distinct; *Jæra marina*, *Jæra kröyeri*, and *Jæra baltica* are supposed to be merely synonyms of *Jæra albifrons;* the second of these is figured in the illustrated edition of Cuvier's Règne Animale.[5]

A species described by Lucas [6] under the name of *Jæra longicornis*, but figured by him in the same work as *Jæra deshayesii*, appears to me to be wrongly assigned to the genus *Jæra*. It agrees with *Janira* in the form of the antennary organs, in the prehensile character of the first thoracic appendages, and in the elongated biramose uropoda. This species is considered by Heller [7] to be identical with Grube's [8] *Jæra filicornis*.

An American species (*Jæra copiosa*), described originally by Stimpson, is declared by Harger [9] to be identical with *Jæra albifrons*. This author discusses the synonymy of other species, and arrives at the conclusion that besides the species mentioned above, *Jæra nivalis*, *Jæra maculata*, and *Jæra grönlandica* (Packard) are probably varieties of *Jæra albifrons*.

[1] Tome iii. p. 149.
[2] British Sessile-eyed Crustacea, vol. ii. p. 321.
[3] *Ann. and Mag. Nat. Hist.*, ser. 4, vol. xvii. p. 80, pl. v.
[4] *Proc. Zool. Soc. Lond.*, 1864, p. 667.
[5] Pl. lxx. fig. 1.
[6] Exploration Scientifique de l'Algérie, t. i. p. 66; t. iv., pl. vi. fig. 4.
[7] *Verhandl. d. k. k. zool.-bot. Gesellsch. Wien*, 1866, p. 733.
[8] Die Insel Lussin, p. 75.
[9] Marine Isopoda of New-England, U.S. Comm. of Fish and Fisheries for 1878, Washington, 1880, p. 315.

The number of species known, therefore, which can be regarded as distinct, are four, viz., *Jæra albifrons*, *Jæra nordmanni*, *Jæra wakishiana*, and *Jæra pubescens*.

A single species which I refer to this genus is described below; it appears to be identical with *Jæra pubescens*, and differs from those already known principally in the form of the uropoda, which are not so rudimentary as in *Jæra albifrons*, &c.

Jæra pubescens, Dana (Pl. II. figs. 6-10).

Jæra pubescens, Dana, Crustacea, U.S. Explor. Exped., pt. ii. p. 744.

A large number of specimens of a Sphæromid, which I identify with *Sphæroma gigas*, were collected in rock pools at Kerguelen; upon several of these were a number of a minute species of Isopod living in a semiparasitic condition, which I identify with Dana's *Jæra pubescens*. The occurrence of this species at Kerguelen was noted first by S. I. Smith.[1] Dana's specimens were from Patagonia; this species like its host and a number of other species is common to Patagonia and Kerguelen. Dana's specimens were obtained from *Sphæroma lanceolatum*, a Sphæromid which hardly differs specifically from *Sphæroma gigas*.

The general outline of the body is oval; the body gradually increases in breadth up to the third segment of the thorax, and thence hardly decreases until the abdominal shield is reached.

The head is roughly quadrangular, broader than long, with a short blunt rostrum. The eyes are placed some way from the lateral margin of the head; they are small and each consists of two elements only—two crystalline cones (fig. 7), and two only are plainly visible.

The first segment of the thorax is rather longer, although narrower, than the two following, which are subequal, the fourth is shorter again. The lateral margins of the segments are rounded, the second to the fourth being somewhat bilobed; the anterior lobe is fringed with short hairs which are wanting posteriorly.

The abdominal shield is rounded, with a slightly pointed obtuse termination, its lateral margins are fringed with short hairs.

The *antennules* (fig. 8) consist of a large oval basal joint followed by a more slender and shorter joint, then come two shorter joints which are subequal; the flagellum consists of only two joints, of which the first is the largest; they are both furnished with sensory filaments.

The *antennæ* (fig. 9) are about half the length of the body; the flagellum is very considerably longer than the peduncle, and consists of about twenty joints; in the peduncle the first three joints are very short, the fourth longer, the fifth longer again but narrower.

[1] *Bull. U.S. Nat. Mus.*, No. 3, p. 63, 1876.

There is no articulated scale on the outer antenna such as is found in *Janira*.

The *uropoda* (fig. 10) are of considerable size compared with what is usual in this genus; the basal joint is wide; the two rami are narrow but of about equal length with the basal piece; the inner ramus is rather longer as well as thicker than the outer. Both are furnished with numerous long stiff hairs.

Rock Pools, Kerguelen.

Jæropsis, Köhler.

Jæropsis, Köhler, Ann. d. Sci. Nat., sér. 6, t. xix. No. 1.

M. Köhler has described a little Isopod from the Island of Sark, which bears many resemblances to *Jæra*, but which he regards as being the type of a new genus; the name employed by him is significant of the affinities of the Isopod. The general form of the body is that of *Jæra*, with which it also agrees in the rudimentary nature of the terminal abdominal limbs of the uropoda. The main structural feature which distinguishes *Jæropsis* from *Jæra* is to be found in the antennæ, which instead of being long and slender with a well-developed flagellum, are extremely small with a rudimentary flagellum. The single species, which is very minute, measuring only from 2 to 3 mm., is named *Jæropsis brevicornis*.

A species obtained at Marion Island during the voyage of the Challenger appears to me to be referable to this genus, but to be specifically different from *Jæropsis brevicornis*. The description of this new species is as follows :—

Jæropsis marionis, F. E. Beddard (Pl. I. figs. 11–15; Pl. II. fig. 1).

Jæropsis marionis, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 105.

The single specimen of this species, from dredge-mud off Marion Island (100 fathoms), differs very distinctly from the other species of the genus.

The specimen is a male, and measures nearly 4 mm. in length.

The head is large and roughly quadrangular in outline; the anterior margin is prolonged between the antennæ into a rostrum which is deeply notched; the eyes are of fair size (I counted seventeen crystalline cones) and dorsal in position; the lateral margins of the head, which are very much bent down, are serrate.

The general shape of the body is cylindrical, the diameter being everywhere approximately equal; the species is also marked by the great convexity of the middle of the body.

The head is about as long as the first two segments of the thorax taken together; the latter are subequal, the third is slightly shorter, the fourth and fifth subequal and very much shorter again; the two last segments of the thorax are quite as long as the two

first. The segments are separated from each other by deep lateral incisions; the gaps separating the head from the first segment of the thorax and the three posterior segments of the thorax from each other being the widest. The lateral margins of the segments are somewhat truncated and serrate. The serrations of the anterior segments are not so conspicuous as those upon the lateral margins of the head; in the three posterior segments the serrations are directed backwards, as is the case with the abdominal shield. The sterna of the thoracic segments have a median ridge.

The *abdominal shield* is somewhat triangular in outline, terminating behind (Pl. I. fig. 14) in three pointed processes, a median and two lateral. In the furrows which separate these are placed the uropoda. The lateral margins of the caudal shield are strongly serrate.

The *antennules* (Pl. I. fig. 11) are very short; the basal joint is the strongest, its two sides are prolonged beyond the articulation of the second joint; the second joint is shorter as well as narrower than the first; the third and fourth joints of the peduncle decrease progressively in length, they are of about the same breadth and considerably narrower than the second. The flagellum has two joints, the distal being very minute.

In the *antennæ* (Pl. I. fig. 12), the third joint is longer than the two basal joints, the fourth is shorter than the third, the fifth longer; the flagellum is very minute, it only consists of four or five small joints.

The *thoracic appendages* (Pl. I. fig. 13) do not present any marked peculiarities, they are all similar and biunguiculate.

The *uropoda* (Pl. I. fig. 15) are placed close to the extremity of the abdominal shield; each consists of a large and broad basal piece which terminates in an inwardly curved spine, and has a serrate inner margin and two minute rami, of which the inner is the larger.

Station 145, off Marion Island, December 27, 1873; lat. 46° 43′ S., long. 38° 4′ 30″ E.; depth, 140 fathoms; volcanic sand.

Trichopleon, F. E. Beddard.

Trichopleon, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 106.

A single specimen of a deep-sea Isopod, dredged at Station 214, does not conveniently fall within any of the existing genera of Asellidæ. It is characterised as follows:—

Body elongated and oval, diminishing towards both extremities. Frontal margin of head straight and projecting between the antennæ. Eyes absent. Thoracic segments subequal, first four directed forwards with an antero-lateral spine, three posterior directed backwards without any lateral spines. No distinction between epimeral and tergal

region of segments. Abdominal segments all fused to form a single oval piece which terminates posteriorly in a short pointed extremity. Antennules with a long flagellum reaching some way along the terminal joint of the peduncle of the antennæ. Antennæ as long as the body; flagellum longer than the peduncle; third joint of peduncle with a rudimentary exopodite; two last joints of peduncle elongated. Mandibles with a three-jointed palp. Thoracic appendages (in the female) not dissimilar to each other, terminating in a single claw. Uropoda moderately long, biramose, outer ramus one-jointed, inner with a small distal and long proximal joint.

This genus comes nearest perhaps to *Janira*, but is to be distinguished by the uniunguiculate thoracic appendages. The general shape of the body is also unlike *Janira*, though in most other particulars it is hard to find any great differences between the two genera. The presence of a rudimentary exopodite on the antennæ is a feature only found in this genus, in *Janira*, and in *Stenetrium*, where it has the form of a flat scale tipped with fine hairs. In other genera this structure is entirely absent, though, as I have already pointed out (p. 17), a stout spine occupying the same position in *Iolanthe* and *Acanthoniscus* may be its representative.

Trichopleon ramosum, F. E. Beddard (Pl. I. figs. 1–10).

Trichopleon ramosum, Proc. Zool. Soc. Lond., 1886, pt. i. p. 106.

This species, as already mentioned, is represented by only a single individual, dredged to the south of the Philippine Islands in 500 fathoms.

The specimen is an immature female and measures 5 mm. in length; it has been stained in picrocarmine and mounted on a slide in Canada Balsam; the sex was ascertained by an examination of the ovaries, which were darkly stained and very conspicuous in consequence; one of these is shown in fig. 7 of Pl. I.; at the two extremities the ovary is formed of indifferent tissue, in the middle is a single row of ova, each surrounded by a follicular layer in which the constituent cells could not be made out. The oviduct which arises at the end of the posterior third is pear-shaped and opens by a slit-like orifice upon the last thoracic segment but two, near to the attachment of the limbs. There were no traces of brood lamellæ developed in this specimen.

The head is rather narrower but longer than the succeeding segment of the thorax; the insertion of the antennules is marked by a deep notch; between the two antennules the head is prolonged into a frontal process which ends squarely. To the outside of the antennules the lateral region of the head is prolonged forwards, terminating in a blunt rounded process which is almost exactly on a level with the frontal margin of the head. There is no trace whatever of eyes.

The three succeeding segments of the thorax are subequal, the first alone being slightly shorter than the two following; the breadth of all these segments is equal and a trifle greater than that of the head. The antero-lateral margins of these segments are directed forwards and terminate in a short sharp spine; the postero-lateral margin is parallel to the antero-lateral, both being bent forwards at an angle to the transverse axis of the segment.

The fourth segment of the thorax is shorter than any of the preceding, it is considerably wider laterally than dorsally, owing to the fact that its postero-lateral margin is directed backwards; it forms, in fact, the transition between the forwardly directed anterior and the backwardly directed posterior segments; its antero-lateral extremity, as in the case of the preceding ones, is furnished with a spine.

The three posterior segments of the thorax become successively narrower but longer; they are directed backwards instead of forwards and have no antero-lateral spines; the anterior margin of the fifth segment is closely applied to the posterior margin of the fourth, the others are separated by considerable lateral incisions, as are the anterior segments of the thorax. These incisions are, however, far less conspicuous than in such genera as *Pleurogonium*.

The abdominal segments are all fused together to form a single piece, which is about as long as the two last segments of the thorax; it is oval in form but wider anteriorly than posteriorly; between the uropoda the caudal shield is prolonged into a short spiny median process.

There is no trace of any segment intercalated between the last segment of the thorax and the abdominal shield. The margins of the abdomen appear to be fringed with slender hairs. The whole surface of the body, both dorsally and ventrally, is quite smooth and free from tubercles or spines of any description. The median dorsal region of the body is regularly convex, the lateral regions somewhat depressed.

The *antennules* (Pl. I. fig. 2) are about as long as the head and first two segments of the thorax together; the first joint of the peduncle is rounded and rather short and broad, the second is longer but narrower, the third is shorter and narrower again, and the terminal joint of the peduncle is very small indeed. The flagellum consists of about fifteen joints, and extends a little beyond the commencement of the distal joint of the antennary peduncle.

The *antennæ* (see fig. 3) are about equal in length to the body; the flagellum is rather longer than the peduncle.

The two basal joints of the peduncle are extremely short, the third a trifle longer, with an articulated scale on the outer side.

The *mandibles* and *maxillæ* I am unable to describe, as they were concealed by the subjacent *maxillepedes*.

The latter appendages are illustrated in fig. 5. The inner margin of the stipes is furnished with five of the hook-like processes peculiar to these appendages, which alternate in position with those of the corresponding appendage of the opposite side. The palp is five-jointed, the two distal joints being more slender than the three proximal.

The *thoracic appendages* are slender and moderately elongated, they terminate in a single claw. Some of these appendages were defective, but they appear to be all more or less similar. The first pair, or perhaps the first two, differ in that the fifth joint is shorter and stouter than it is in the succeeding appendage (see figs. 8, 9).[1] The first four pairs arise from the antero-lateral margins of their segments, the three posterior pairs from the postero-lateral margin.

The *uropoda* (fig. 6) consist of an elongated, slender basal joint, with which are articulated two rami, the innermost of which is longer as well as stouter than the outer; the inner ramus shows indications of division into two joints.

Munna, Kröyer.

Munna, Kröyer, Naturhist. Tidsskr., Bd. ii., 1839, p. 612.

Definition.—Body of the male in most cases elongated and narrow, that of the female broad and oval. Antennæ narrower in the posterior region of the thorax. Head very broad, and one-fourth or one-fifth of the length of the body. Eyes usually fixed on prominent stalks which project from the side of the head. Antennules about the length of the head, anterior longer than the body, with a flagellum shorter than the peduncle; fourth and fifth joints of the peduncle elongate. Thoracic appendages biunguiculate, the first pair forming short and powerful prehensile appendages, the following six pairs long and slender, gradually increasing in length, and the last three pairs markedly longer than the foregoing. Abdomen without a single anterior segment, free, elongated quadrangular, narrower than the thorax; uropoda in the form of short stumps, or absent.

Remarks.—The affinities of *Munna* are with *Pleurogonium* and its immediate allies, though in having biunguiculate thoracic appendages, this genus is now nearly related to *Jæra*, *Janira*, &c. In all other points, however, except in the presence of well-developed eyes, *Munna* presents very close resemblances to *Pleurogonium*.

Only five species of this genus are at present known, all of which are inhabitants of the shallow water off the coasts of Great Britain, Norway, North America, &c.; in the present Report I have two new species to add, both of which are from shallow water off the Island of Kerguelen; there is a third specimen from the same locality, but it is very small, and I believe is similar, so that I have not thought it advisable to describe it.

[1] The difference has not been rendered so marked in the figures as it ought to have been.

A fourth specimen from Marion Island is also apparently immature. Both the new species are remarkable in certain ways; in *Munna maculata* the male has evidently the same form of body as the female, and is not proportionably elongated, as is the case, for example, with the second species, *Munna pallida;* in this latter the eyes are not elevated upon appreciable stalks as they are in other species of the genus.

Munna maculata, F. E. Beddard (Pl. XI. fig. 14).

Munna maculata, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 98.

A single specimen of this species, which is a male, was dredged in 28 fathoms at Kerguelen.

Although the specimen is a male it does not display the cylindrical form of body which is generally characteristic of that sex, and which is the case, for example, with the next species of this genus to be described.

The present species is large as the genus goes, measuring 4 mm. in length.

The specimen is mounted upon a slide in Canada balsam, and is remarkable for the numerous black pigment spots which cover the body.

The head is about as long as the first two segments of the thorax; its anterior margin is straight and fringed with a row of stiff branched hairs; on either side is a deep notch for the insertion of the antennules; just behind the latter, and from the dorsal surface of the head the eyes take their origin; they are placed at the summit of a moderately long stalk, which is constricted towards its base.

The first four segments of the thorax are subequal and in every case longer than the three posterior, which are also narrower and are curved backwards, as in the typical members of the genus; the thoracic segments have short rounded epimera which are invisible on a dorsal view.

Between the thorax and the abdominal shield, as in other species of this genus and in allied genera such as *Pleurogonium*, there is an intercalated free segment which has not the lateral extension of the foregoing segments.

The abdominal shield is oval in form, and very convex dorsally, it ends in an obtuse rounded extremity.

The *antennules* are about as long as the head and the first segment of the thorax taken together. The two basal joints are very stout, and the two distal joints of the peduncle are subequal and extremely small; the flagellum consists of four joints which are elongated, but gradually decrease in length towards the extremity, the terminal joint being very short; the length of the entire flagellum is about equal to that of the peduncle.

The *antennæ* are very long, about twice the length of the whole body of the animal; the last two joints of the peduncle are very elongate, the terminal joint being the longer of the two; the flagellum is shorter than the peduncle.

The first pair of thoracic appendages are modified into a prehensile hand; they are stouter and shorter than the succeeding appendages of the thorax; the first joint of the limb is rather short and slender, the following joint is of equal length but much stouter; the third joint is much shorter and narrower; in every case these joints are wider at the articulation with the following joints than with the previous; the fourth joint of the limb is extremely large and stout and triangular in form; the distal side forms a cutting margin against which the comparatively small fifth joint plays.

The remaining thoracic appendages are more slender than the first pair but still stout, and their great length is characteristic of the genus; the more posterior pairs of these appendages are considerably longer than the body; the three basal joints are comparatively short and subequal; the fourth joint is long and equally stout, and provided with tufts of spines; the fifth joint is the longest but considerably more slender than the preceding; it is also furnished with tufts of hairs and spines; the sixth joint is very stout and the limb ends in two claws.

The *uropoda* are small conical stumps placed near to the end of the abdominal shield.

Station 149D, off Royal Sound, Kerguelen, January 20, 1874; lat. 49° 28′ S., long. 70° 13′ E.; depth, 28 fathoms; volcanic mud.

Munna pallida, F. E. Beddard (Pl. XI. fig. 15).

Munna pallida, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 98.

The present species is also from Kerguelen, and like the last is represented by a single male individual; this species, however, has the more typical characters of a male in being elongated and of approximately equal breadth throughout.

It affords a transition to such genera as *Jæra* by the structure of the eyes, which are small and not raised upon stalks as in the typical *Munna;* the free abdominal segment, the elongated thoracic appendages with two terminal claws, and the rudimentary conical uropoda show that this species in other respects conforms to the same generic type as the last.

Munna pallida is a smaller species than the last, measuring rather less than 3 mm.; it is pale and transparent and without the black pigment spots of *Munna maculata.*

The head terminates in a straight truncated anterior margin, the lateral notches for the reception of the antennules are deep, the lateral regions of the head are pointed anteriorly and rounded posteriorly; the eyes are conspicuous and placed just behind the antennules; they are quite sessile, not raised on a stalk as is so usual in this genus.

The first segment of the thorax is longer than any of the three succeeding, which are subequal; the lateral margins of these segments are rounded; the epimera which are small are also rounded laterally. The three posterior segments of the thorax gradually

increase in length, the last being the largest and about equal to the anterior segments; these segments are of course curved backwards; their lateral margins are rounded, and the rounded epimera are far more conspicuous than in the anterior segments of the thorax.

The abdominal shield is preceded by a single free segment, as in other species of this and allied genera.

The abdominal shield itself is oval, ending in an obtusely rounded extremity; near to this on either side are articulated the uropoda.

The *antennules* are very much like those of the last species but differ in that the flagellum is only three jointed.

The *antennæ* are unfortunately broken off at the fourth joint. They do not appear to differ from those of other species, so far as regards the basal joints of the peduncle.

Of the thoracic appendages only the third and seventh have been preserved; it is clear, however, from these, that the present species agrees with other species of its genus, in that the posterior are longer than the anterior thoracic appendages. The posterior pair of thoracic appendages are about as long as the body itself.

These appendages are distinguished, like those of other species of the genus, by the great length and slenderness of the fifth joint, which like the preceding is moderately spiny. The terminal joint is short and has two subequal claws.

The *uropoda* are very much like those of the last species, being short conical appendages with a few hairs at the apex.

Kerguelen; depth, 30 fathoms.

Pleurogonium, G. O. Sars.

Pleurogonium (*Pleuracantha*), G. O. Sars, Forhandl. Vidensk. Selsk., 1863, p. 219.

Three small Isopoda from Tristan da Cunha and Kerguelen appear to belong to this genus, which may be defined as follows:—

The anterior region of the body (head and thorax) greatly dilated and depressed, the three posterior segments of the thorax much narrower than the anterior and directed backwards. Head small, obtusely pointed or rounded anteriorly; eyes absent. Abdominal segments fused into an oral pointed abdominal shield, with the exception of the first segment, which remains distinct. Antennæ moderately long, the anterior pair equal to, or shorter than the posterior pair; flagellum of antennules short, two or three jointed. First pair of thoracic appendages stout and cheliform; following appendages similar in structure, but increasing progressively in length; furnished with a single terminal claw. Abdominal operculum of female large, with a sharply pointed apex. Uropoda extremely short, projecting but slightly beyond the margin of the caudal shield, biramose, each ramus composed of a single point, the inner larger than the outer.

The genus *Pleurogonium* (formerly termed by Sars *Pleuracantha*) was founded on specimens from the Christiania Fjord, living at a depth of 10 to 15 fathoms. Since the first description of the genus published in 1865, Dr. G. O. Sars has described the new species *Pleurogonium inerme*[1] and *Pleurogonium spinosissimum*,[2] the type species of the genus being *Pleurogonium rubicundum*. These are all shallow-water forms, not ranging apparently below 100 fathoms.

The genus *Pleurogonium* comes near to *Munna* in structure, and it is also closely allied to *Leptaspidia*, and to the remarkable genus *Dendrotion*, lately described by Sars; it is more particularly related to these two latter genera, with which it agrees in the uniunguiculate character of the thoracic limbs, those appendages being in *Munna* biunguiculate; the absence of eyes is also a character which *Pleurogonium* shares with *Dendrotion* and *Leptaspidia;* there is, however, no possibility of confounding it with either; in *Leptaspidia* the uropoda are uniramous and one-jointed, while in *Dendrotion* they have altogether disappeared; these appendages in *Pleurogonium*, though rudimentary, are more developed than in *Leptaspidia*, consisting as they do of two rami. The articulation of the antennary organs of *Leptaspidia*, below the cephalic shield, is another among the many characters which distinguish the genus from *Pleurogonium*.

The Challenger obtained three specimens, which appear to be the types of as many new species, belonging to this genus. Two of them, which are described below under the names of *Pleurogonium albidum* and *Pleurogonium serratum*, evidently come very near to Sars's *Pleurogonium rubicundum*, with which they agree in the lateral spines of the anterior thoracic segment; in the latter species, however, the posterior segments of the thorax are not furnished with such spines, which are present in my own species. The anterior prolongation of the head in *Pleurogonium rubicundum* is not found in the two Kerguelen species.

The third new species to be described in the present Report is *Pleurogonium minutum*, which comes nearest to Sars's *Pleurogonium inerme*, being like it without the spiny processes of the epimera; an obvious point of difference between the two species is the long lateral processes of the head in *Pleurogonium minutum*, which are not present in *Pleurogonium inerme*.

Pleurogonium albidum, F. E. Beddard (Pl. III. figs. 7–13).

Pleurogonium albidum, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 101.

The following description of this species is based upon a single female example from Kerguelen, measuring about 3 mm. in length.

The general shape of the body is much like *Pleurogonium rubicundum;* that is, the

[1] *Forhandl. Vidensk. Selsk.*, 1882, No. 18, p. 67.

[2] Beretning om i Sommeren, 1865, foretagen Zoologisk Reise, p. 30; *Archiv f. Math. og Naturv.*, 1877, p. 352.

anterior segments of the body are much broader than the three succeeding segments, as well as longer. The surface of the body is quite smooth, with the exception of a transverse ridge on each of the thoracic segments.

The head is short and almost enclosed by the succeeding segment of the thorax; its dorsal surface, as of the body generally, is very convex, the anterior margin of the head is rounded; the antennules are lodged in a semicircular incision situated at the postero-lateral extremity of the head.

The four anterior segments of the thorax with the head are about as long as the three posterior segments and the abdomen taken together. The first two segments are equal in length and rather shorter than the third and fourth, which are themselves equal. The width of these segments gradually increases up to the third; the fourth segment is not much narrower than the third. The lateral margins of the segments project as rounded elevations; in the second and third segments there is a straight marginal region behind the rounded projection, which in the first and fourth segments occupies the whole of the lateral margin. The epimera of these segments are prolonged into stout spiny processes; in the first segment the epimera are as well-developed as in the succeeding ones.

The three posterior segments of the thorax are separated from each other and from the fourth by deep lateral incisions; their antero-posterior diameter is considerably less than that of the preceding segments and they are also narrower; their width decreases regularly from the fifth to the seventh, but their length increases slightly. On each of these segments, as on the four anterior, there is a median dorsal ridge which ceases some way before the lateral margin of the segment; the lateral margins of the segments are rounded off, and the whole of the lateral regions are directed backwards, all three segments being approximately parallel.

The epimera are more conspicuous on a dorsal view than those of the anterior segments, as they project further outwards; each is prolonged into a spine-like process overlying the articulation of the limbs, which is shorter in these segments than in the anterior.

Between the last thoracic segment and the abdominal shield there is a single free abdominal segment, which is separated by a distinct suture both from the seventh segment of the thorax and from the abdominal shield; it bears a median ridge like that upon the preceding segments, but the lateral regions are not prolonged; the segment is narrower than the abdominal shield. The latter is divided into two regions by a notch at the point where the uropoda are articulated; the anterior region is nearly circular in outline; the posterior region is triangular and terminates in a sharp point; the lateral margin of the posterior region (fig. 12) is slightly serrated, the serrations becoming more marked towards the apex, and fringed like the rest of the abdominal shield with a few slender hairs.

The *antennules* (fig. 8) are of about half the length of the antennæ.

The peduncle consists of the usual four joints, but it is impossible, except by the analogy of other Isopoda, to draw any line of demarcation between what ought to be

considered peduncle and what flagellum ; the first two joints of the peduncle are of equal length, but the second is more slender than the first ; the difference in size between them is, however, much less than is ordinarily the case ; the third joint is very much narrower and shorter than the second, and the fourth smaller still ; the two joints of the flagellum are subequal and a little longer than the terminal joint of the peduncle.

The *antennæ* (fig. 9) have a peduncle consisting of six joints ; the first two are subequal and very short ; the third is rather more than twice the length of the first two taken together ; the fourth is again short, about half the length of the third joint ; the fifth joint is as long as the third and fourth together, and the sixth is longer still but more slender ; the flagellum consists of about eight joints which are elongated but gradually decrease in length towards the extremity ; the flagellum is a little shorter than the terminal joint of the peduncle.

The first pair of thoracic appendages are stouter than the succeeding, and are prehensile ; the proximal joint (see Pl. III. fig. 10) is the longest and at the same time the most slender ; the two following joints are short, stout and subequal ; the following joint is very much broader and at the same time longer than either of the preceding ; the fifth joint is of nearly equal length but narrower ; the distal joint is extremely narrow and curved, and folds back upon the penultimate joint of the limb.

The succeeding pairs of limbs are longer and more slender than the anterior pair and are similar to each other in structure.

The first joint is the longest, the second is not much shorter, the third is of about half the length of the second ; the fourth joint is as long or very nearly as long as the first ; it has a series of spines along the inner margin ; the fifth is much more slender than any of the preceding which are subequal in diameter ; it is about as long as the fourth joint, and like it furnished with a series of stiff hairs ; the terminal joint (fig. 11) is very short and bears a spine about equal to itself in length, as well as a short slender hair which corresponds to the second spine developed here in *Munna*, *Jæra*, &c.

The *operculum* which covers over the gill appendages extends to the very end of the pointed extremity of the abdominal shield.

The *uropoda* (fig. 13) are small and biramose, the inner branch longer and stouter than the outer.

Station 149K, off Christmas Harbour, Kerguelen, January 29, 1874 ; depth, 120 fathoms ; volcanic mud.

Pleurogonium serratum, F. E. Beddard (Pl. III. fig. 14).

Pleurogonium serratum, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 102.

This second species of *Pleurogonium* from Kerguelen does not present many differences from *Pleurogonium albidum*, but appears to belong to a different species.

The single specimen is a female, and is considerably smaller than the single specimen of the last species, measuring about 2 mm. in length.

The head is small and is almost enclosed by the following segment of the thorax; the frontal margin is straighter than in the last species, and the articulation of the antennæ is not so near to the posterior boundary of the head; the hinder margin of the semicircular notch which encloses the basal joint of the antennules is prolonged further outwards, and uniting with the posterior margin of the head, forms a narrow pointed process which extends laterally nearly as far as to the spiny epimeron of the first segment of the thorax.

The thoracic segments are so very like the last species that no particular description appears to be necessary; the epimeral spine of the first segment, however, is much smaller in proportion to the following spines than it appears to be in *Pleurogonium albidum*.

The most characteristic and obvious difference between the two species is in the abdominal shield; this is preceded in the present species, as in *Pleurogonium albidum*, by a free abdominal segment, not produced laterally like the three posterior segments of the thorax. The general shape of the abdominal shield in *Pleurogonium serratum* is like that of *Pleurogonium albidum*, only the posterior termination is blunter; the lateral margins of the caudal shield as far back as the articulation of the uropoda are strongly serrate, the serrations commence gradually, and somewhat behind the boundary line between the abdominal shield and the free abdominal segments; they terminate, however, abruptly just before the articulation of the uropoda; there is no trace of such serrations in *Pleurogonium albidum* except along the posterior extremity of the abdominal shield.

The lengths of the antennules and the antennæ are as 5 : 6; these two pairs of appendages are in fact very nearly equal in length; there is not at any rate the great disproportion between them that has been referred to in *Pleurogonium albidum;* in this respect the present species not only differs from *Pleurogonium albidum*, but is a more typical species of the genus according to its definition by Sars.

The structure of the *antennules* presents no differences from the last species.

The *antennæ* differ from those of *Pleurogonium albidum*, not only in their smaller size, but in the fact that the flagellum is longer than the terminal joint of the peduncle instead of shorter; the two distal joints of the peduncle are also much more slender than the proximal joints. I cannot, however, lay any great stress upon the specific differences indicated by the antennary appendages. The appearance of these appendages was greatly altered by the mounting of the specimen in glycerine jelly.

The *uropoda* are biramose.

Station 149K, off Christmas Harbour, Kerguelen, January 29, 1874; depth, 120 fathoms; volcanic mud.

Pleurogonium minutum, F. E. Beddard (Pl. XI. fig. 13).

Pleurogonium minutum, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 103.

The third new species of this genus was dredged off Tristan da Cunha in 100 to 150 fathoms of water; it is represented by only a single specimen, which, like the other two species, is a female with eggs in the brood cavity.

The specimen measures about 1 mm. in length.

The shape of the body is characteristic of the genus, the anterior region of the thorax comprising the first four segments being broad, and the posterior region narrow in comparison.

The head is rounded anteriorly and is extremely convex like the rest of the body; behind the articulation of the antennæ the lateral margin of the head is prolonged into a short process curved forwards. The antero-posterior diameter of the first four thoracic segments is subequal, and the breadth gradually increases up to the third, which is the widest; the lateral margins of these segments are rounded and they are furnished with short epimera, which are also rounded, and not prolonged into spine-like processes as are the epimera of the two last species, *Pleurogonium albidum* and *Pleurogonium serratum*. The dorsal surface of the body is quite smooth.

The three posterior segments of the thorax have the usual form that is characteristic of the genus; they are furnished with epimera which are evident on a dorsal view, those of the anterior segments being concealed when viewed from above; the epimera are truncated at their free extremity and are not prolonged into spines. Between the last segment of the thorax and the abdominal shield there is a short intercalated segment as in other species of this genus.

The abdominal shield is oval, tapering towards its extremity; at the end of the second third is a notch which marks the articulation of the terminal pair of abdominal limbs; the lateral margin of the abdominal shield for a short space anteriorly to this notch is serrate, but the serrations are not anything like so conspicuous as in the species which I have named *Pleurogonium serratum*.

The *antennules* are practically identical in structure with those of the last two species; the first joint extends a very little way beyond the lateral process of the head.

The *antennæ* are not so much longer than the antennules as they are in *Pleurogonium albidum*, where the proportion in length was as 2 : 1; in *Pleurogonium minutum* the antennæ are not half again as long as the antennules, the proportion being about 6 : 4.

In this respect, therefore, the present species is more typical than *Pleurogonium albidum*, as it is stated by Sars in his definition of the genus that the two pairs of antennary appendages are of about equal length.

The difference of proportionate length between the antennæ of this species and of *Pleurogonium albidum* is brought about by the comparative shortness of the third joint, which is not much longer than the second; the fourth joint is also very short, the fifth is extremely long.

The first pair of thoracic appendages, as in other species of the genus, is modified into a prehensile organ.

Tristan da Cunha, 100 to 150 fathoms.

Neasellus, F. E. Beddard.

Neasellus, F. E. Beddard, Narr. Chall. Exp., vol. i. p. 882, fig. 326.

This genus is represented in the Challenger collection by a single small Isopod from Kerguelen.

Generic Character.—Body broad and flattened, wider anteriorly than posteriorly; surface of the body smooth dorsally, fringed laterally with numerous short flattened spines. Head separated by a deep incision from the thorax and extremely wide, eyes absent; the antennæ are situated at the extreme lateral margins of the head. First segment of the thorax larger than any of the following, fused with the second segment except laterally; following segments of the thorax distinct and subequal, separated by deep lateral incisions; all the segments of the thorax, with the exception of the fourth and seventh, with long rounded lateral processes. Abdominal shield rhomboidal, notched at the apex, and laterally where the uropoda articulate. First pair of antennæ much shorter than the second pair, consisting of six joints of which the two distal may be reckoned as flagellum; antennæ with a short flagellum about as long as the distal joint of the peduncle. First pair of thoracic appendages modified into a prehensile limb. Uropoda biramose, very short, like those of *Pleurogonium*.

Remarks.—There can be no doubt that this forms a very distinct generic type. Apart from the remarkable form of this Isopod, the great lateral extension of the head with the antennæ articulated at the extreme lateral margin and its separation by a deep incision from the thorax, is quite a novel character; moreover, the almost complete fusion of the two first thoracic segments is a character quite new to the family to which this genus evidently belongs; in other respects it appears to come nearest to *Pleurogonium* and *Paramunna;* in the articulation of the antennules below the lateral extension of the head this genus recalls *Leptaspidia*,[1] where both pairs of antennary appendages are quite covered by the head, arising altogether from its lower surface.

[1] Westwood and Spence-Bate, Sessile-eyed Crustacea, vol. ii. p. 333.

Neasellus kerguelenensis, F. E. Beddard (Pl. II. fig. 11; Pl. III. figs. 1–6).

Neasellus kerguelenensis, F. E. Beddard, Narr. Chall. Exp., vol. i. p. 882, fig. 326, 1885.

The single specimen belonging to this new species and genus has already been briefly described and figured by myself in a notice of the Isopoda collected during the voyage, published in the first volume of the Narrative. I have also referred to it as to the other new species of Isopoda in a Preliminary Report communicated to the Zoological Society of London.

The extreme length is about 2 mm.

The body is broad and convex; the general outline is pear-shaped owing to the great breadth of the head and of the two anterior segments of the thorax.

The head is immensely extended laterally, and its shape reminds one very forcibly of that of the hammer-headed shark; only about the middle third of the head is articulated with the first thoracic segment, the lateral regions are separated by deep curved incisions; the central region of the head is convex, the lateral regions are flattened; the anterior margin of the head is curved, convex in the middle region and concave laterally; the lateral margins are notched where the antennules articulate; the antennæ are covered over at their insertion. The whole of the anterior and lateral margins of the head are fringed with peculiar spines, which are flattened and somewhat conical in form, often curved; they are placed close together, no interval being left between two adjacent spines; the posterior margin of the head (bordering the lateral incision) is quite smooth and free from spines. The dorsal surface of the head is also quite smooth.

Eyes are completely absent.

The two first thoracic segments are together about equal in length to the head in its middle region. The line of suture which separates these two segments from each other is obliterated except for a short space laterally. The width of both these segments is slightly greater than the width of the head; laterally both of them project as rounded spatulate processes fringed with spines similar to those upon the head; the anterior forward concave margin of the first segment is, like the posterior margin of the head, free from these spines.

The remaining segments of the thorax are subequal in length, and about one-fourth of the length of the conjoined anterior segment; judging from the separated lateral regions of the two first segments, the second of these would be about equal to the following segments.

The third, fifth and sixth segments have long oval lateral processes like those of the anterior segments, and like them also fringed with spines; the diameter of these segments is not less than that of the first two; the lateral regions of the sixth segment are more bent backwards; in the fourth and seventh segments of the thorax the lateral regions do

not project so far laterally, but are similar in structure; the surface of the thorax is quite smooth. Between the last thoracic segment and the abdominal shield there is a distinct segment as in *Pleurogonium*. The shape of the abdominal shield is rhomboidal, with a shallow notch at the posterior extremity and two very deep notches laterally where the uropoda are articulated; the antero-lateral margins are smooth, the postero-lateral margins are beset with spines like the rest of the body except at the lateral and terminal notches.

The *antennules* (Pl. III. fig. 1) are about one-fourth as long as the antennæ, both appendages arise as already stated at the extreme lateral margin of the head, where there is a notch for the basal joint of the antennules; the antennules do not, however, arise entirely from the upper side of the head, being overlapped by the anterior lobe of the lateral region of the head as shown in Pl. II. fig. 11. The basal joint is stouter but shorter than the following joint; the third and fourth are both narrower and shorter than the second joint; the flagellum consists of only two rather elongated joints. The antennules of this species are quite like those of *Pleurogonium* (*cf.* Pl. III. figs. 1, 8).

The *antennæ* (fig. 2) are rather more than half the length of the body.

The basal joint is extremely small, the second joint is short and furnished with a single spine on the outer margin close to its articulation with the third joint; the latter is comparatively long, with a row of spines along the outer margin similar to those which border the body; these only extend along the proximal two-thirds of the joint; the three succeeding joints of the peduncle are much more slender than the basal joints; the fourth is extremely short, the two following elongated. The flagellum is a little longer than the distal joint of the peduncle; its joints are few and elongated.

The mouth appendages I am unable to describe, as they were hidden by the thoracic appendages, except to remark that the mandible is furnished with a palp.

The first pair of *thoracic appendages* (fig. 3) are stouter than the rest and cheliform; the proximal joint has a few spines on the outer margin near to its articulation with the succeeding joint; there were six or seven of them, which decreased in length towards either end of the row. In the succeeding *thoracic limbs* (fig. 4) there are also a few similar spines upon the basal joints; I noticed them in the three following pairs of limbs, but not in the three posterior pairs; in no case, however, were they so numerous as in the cheliform appendages.

The *uropoda* are small and exactly resemble those of *Pleurogonium;* these appendages are displayed in a dorsal and ventral view in figs. 5, 6; they are biramose, and the larger endopodite completely covers the small exopodite when the appendages are viewed from below; the extremity of each of the branches are furnished with a few longish simple hairs.

Station 149K, off Christmas Harbour, Kerguelen, January 29, 1874; depth, 120 fathoms.

Since the above was written I have received from Mr. Dendy a number of other specimens of this species from Station 320 (600 fathoms). They were found upon two species of Sponges, *Esperella lapidiformis*, Ridley and Dendy, and upon *Gellius carduus*, var. *lævis*, Ridley and Dendy. The specimens agreed very closely with the type described above, the only difference being that in one individual there were traces of eyes in the shape of two crystalline cones, together with the corresponding pigmented retinal cells. This forms another instance of a shallow-water species ranging into deep water.

Astrurus, F. E. Beddard.

Astrurus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 99.

Generic Character.—Body narrow, oval, tapering posteriorly, everywhere densely beset with short spines; head terminating in front in a long bifid rostrum; eyes absent (?); head and four anterior segments of the thorax furnished with a long spine on either side, covered with minute spines, similar to those which cover the body; three posterior segments of thorax with a pair of much smaller spines; abdominal segments with the exception of the first fused into a single piece which is pear-shaped; it terminates behind in four curved short spines arranged like a cross; antennules short; four joints on the peduncle with a two or three-jointed flagellum; antennæ more than half the length of the body; the two distal joints of the peduncle are elongated; the flagellum is about as long as the last joint. Mandibles with a long palp consisting of three joints. Anterior pair of thoracic limbs prehensile in form. Posterior pairs of thoracic appendages elongated; thoracic limbs terminating in a single claw. Uropoda consisting of a single conical joint, very short, with a minute distal joint.

Remarks.—This genus is closely allied to *Munna*, *Paramunna*, *Leptaspidia*, and *Pleurogonium*, it perhaps comes nearest to the two last mentioned genera; it agrees with *Leptaspidia* and *Pleurogonium* in the general shape of the body. With *Leptaspidia*, *Astrurus* corresponds in the form of the antennary organs and of the uropoda; in *Leptaspidia*, however, the thoracic appendages are not so elongated as in *Astrurus*, and in this feature of its organisation the latter genus presents affinities to *Munna* and *Dendrotion*; *Munna*, however, differs from *Astrurus* in having two claws at the termination of the thoracic appendages; there is only one in *Astrurus*, as in *Pleurogonium* and the other genera that have been mentioned; if I am right in describing the two lateral projections of the head with their orange-coloured contents as eyes, this genus will present another strong point of resemblance to *Munna*, and especially to *Acanthomunna*.

Astrurus crucicauda, F. E. Beddard (Pl. V. figs. 9–19).

Astrurus crucicauda, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 100.

This, the only species of the genus, is represented by a very considerable number of specimens dredged in shallow water off the shores of Kerguelen; it is a small species, the largest individuals only measuring 4 mm. in length.

The body is oval in general outline, the anterior region of the thorax being of greater width than the posterior region, the surface of the body is abundantly furnished with spines; the head is narrower than the succeeding segment of the thorax, it is prolonged in front into two long slightly divergent processes, which are rather longer than the head itself. Behind this bifid rostrum on either side the margin of the head is incised for the insertion of the antennules; posterior to the insertion of these, the margin of the head is prolonged laterally into a process which is rather wider at its free extremity than at the base; the general appearance of this process is very like that of the "stalked" eyes of the allied genus *Munna*; in the interior was an orange coloured substance which is of the same tint as the partially disclosed eye-pigments in many Crustacea; the surface of the lateral process is, however, beset with numerous spines, and its extremity ends in a particularly long spine.

The four anterior thoracic segments are of equal or nearly equal length; their breadth gradually increases up to the third, which is the widest; the median region of each segment, which is equivalent to nearly the whole of it, is convex and densely covered with spines, the lateral margins of the segments are prolonged into narrow spiny processes of considerable length, which are themselves covered with spines. In the first two segments these spines follow the general curvature of the segments themselves and are directed forwards; in the third segment they are directed at right angles to the longitudinal axis of the body, and in the fourth segment slightly backwards. The length of the spines is about one-third of the diameter of the body.

Of the three posterior segments of the thorax the first two are subequal in length and shorter than the anterior segments, they decrease gradually in width; the seventh thoracic segment is equally long but narrower again.

The lateral margins of these segments are not furnished with the long processes of the anterior segments of the thorax, only in the fifth and sixth segments one of the small spines which fringe the body is elongated to a greater extent than the rest; on the seventh segment this spine is hardly larger than the surrounding ones.

The abdominal shield is constricted anteriorly, and there is a distinct free abdominal segment; the middle portion is oval; behind the articulation of the uropoda it becomes suddenly narrower, and terminates behind in the peculiar fashion indicated in fig. 18 of Pl. V.; the posterior extremity is formed by four somewhat curved spines arranged with reference to each other like the arms of a starfish, the fifth arm being as it were widened out at the base of attachment to the abdominal shield. The surfaces of this region of

the body are, as elsewhere, covered with short spines, which are here as on the posterior segment of the thorax hooked; the posterior region of the abdominal shield, from the articulation of the uropoda onwards, is smooth and entirely devoid of spines, with the exception of the four terminal spines.

The *antennules* are displayed in fig. 10 of Pl. V.; they consist of a two-jointed peduncle and a five or six-jointed flagellum; in the peduncle the proximal joint is broader as well as shorter than the succeeding joint.

The *antennæ* (fig. 9) are very much longer than the antennules, but not so long as the body; the proximal joints are short and subequal; the two distal joints of the peduncle are of great length, the last being slightly the longest; the flagellum is shorter than either of the two terminal joints of the peduncle; it is composed of twenty or more joints, of which the first is the longest.

The *mandibles* terminate in a bifid masticatory process, each division of which is again divided into two or three teeth; the masticatory edge is also furnished with several denticulated spines; there is a stout molar process; the palp is long and three-jointed, the middle joint is rather the longest; the terminal joint and the distal half of the middle joint are beset with a single row of fine spines; at the extremity of the distal joint, which is somewhat curved, are four or five longish stiff hairs, which decrease gradually in length from before backwards.

One of the *maxillipedes* is represented in fig. 12; the palp is five-jointed, the joints gradually decreasing in width towards the extremity; the inner margin of the stipes is furnished with two processes shown more highly magnified in fig. 13; they evidently correspond to similar structures in other Isopods, especially in the Munnopsidæ.

The first pair of *thoracic appendages* are modified into prehensile limbs; one of these is displayed in fig. 14 of Pl. V.; the proximal joint is long and rather stouter than the succeeding joint, one margin is fringed with a row of hooked spines; the following joints are short, the second rather longer than the third and fourth, which are subequal; the fifth joint is oval and rather swollen, the inner margin, against which the narrow sixth joint rests, has a few slender spines.

The remaining *thoracic appendages*[1] are elongate, particularly the three posterior pairs; the proximal joints are furnished with several rows of spines; the terminal joint of each limb is short and bears a long, curved, slender spine and a short slender hair on the inner side of the former; this arrangement is, however, very different from the two subequal terminal claws that are found in the thoracic appendages of *Munna* and other genera.

[1] In the interior of several of the thoracic appendages, probably lodged in the vascular channels, were occasionally a number of green bodies of varying form, which I take to be parasitic Algæ. I am not aware that the occurrence of parasites of this class have been noted in the Isopoda, though parasitic Infusorians (*Anoplophrya circulans*, Balbiani, *Recueil zool. suisse*, ii., 1885, p. 277), are known from the appendages of *Asellus*. The presence of green bodies presumably coloured by chlorophyll might be useful in determining, in disputed cases, whether a given specimen really came from the bottom or had been caught up by the dredge in the surface waters.

The *uropoda* are rudimentary; each consists of a somewhat conical piece articulated to the abdominal shield by its broad end; at the free extremity there are a number of long hairs, and a minute articulated scale which appears to me to represent the endopodite; in figs. 16, 17 of Pl. V. the terminal portion of this appendage is shown more highly magnified.

Station 149K, off Christmas Harbour, Kerguelen, January 29, 1874; depth, 120 fathoms.

Ischnosoma, G. O. Sars.

Ischnosoma, G. O. Sars. Beretning om i Sommeren, 1865, foretagen Zoologisk Reise ved Kysterne af Christianias og Christiansands Stifter. Christiania, 1866, p. 34.

The Challenger collection contains two fragments of Isopods, which appear to belong to this genus and to represent two new species of it, as well as a single complete specimen of another species.

This genus was formerly regarded by Sars as belonging to the Munnopsidæ; but it has since been removed by him to the family Asellidæ. In his account of the Isopoda collected by the Norwegian Expedition, Dr. Sars has pointed out that although the general aspect of the Crustaceans belonging to this genus is not unlike that of the Munnopsidæ, the absence of any modification into natatory organs of the three posterior pairs of thoracic appendages is opposed to their being placed in this family. The same is also the case with *Macrostylis*.

The genus is defined by Sars as follows:—

Body elongate and narrow, broadest at first segment of thorax; hinder part of segment four and anterior part of segment five firmly connected, and forming an hour-glass shaped portion which is nearly equal in length to half the body. Head small and rounded, eyes absent. The abdominal segment much longer than broad, constricted at the base, rather dilated towards the apex and obtusely rounded. Upper antennæ projecting a little beyond the first joint of the peduncle of the lower antennæ, six-jointed, the second joint narrow and elongated; lower antennæ slender, longer than the body, the flagellum about equalling the peduncle in length and composed of about nineteen joints. Feet of the first pair short and robust, subprehensile, the antepenultimate joint strongly dilated. Following feet slender and elongated, similar to each other, six-jointed, the last joint forming a claw very elongate in the posterior three pairs of limbs. Caudal appendages simple.

Sars has described two species of this genus, viz., *Ischnosoma bispinosum* and *Ischnosoma quadrispinosum*; the former is distinguished by the presence of a spinous prolongation of the lateral margin of the first thoracic segment; in *Ischnosoma quadrispinosum*, the first and fourth thoracic segments are thus provided, and the uropoda are rudimentary. Two of the species to be described in the present Report are distinguished in the first place by their very large size as compared with the two northern representa-

tives of the genus. *Ischnosoma bacillus* is characterised by the presence of a long lateral spine on the fifth as well as on the fourth segment of the thorax. *Ischnosoma bacilloides* may be distinguished from its congeners, by the fact that both the sixth and fifth segments of the thorax have the lateral spines. Other differences will be pointed out in the course of the following descriptions of these species. The third species, which I have named *Ischnosoma spinosum*, is a near ally of Sars's two species, and differs very considerably from *Ischnosoma bacillus* and *Ischnosoma bacilloides*. The genus as at present known falls into two subdivisions; the northern species *Ischnosoma spinosum*, *Ischnosoma bispinosum*, and *Ischnosoma quadrispinosum* are distinguished by their small size, by the comparatively small size of the fourth and fifth segments of the thorax as compared with the hinder end of the body, and by the great length of the first free abdominal segment. The antarctic species, *Ischnosoma bacillus* and *Ischnosoma bacilloides*, are characterised by their large size, by the great length of the fourth and fifth segments of the thorax, and by the extreme shortness of the free abdominal segment.

Ischnosoma spinosum approaches the genus *Munnopsis* more nearly than any of Sars's species by reason of the fourth thoracic segment, which is much more like the preceding, and is apparently not so elongated as in *Ischnosoma bispinosum* and *Ischnosoma quadrispinosum*. In this species, therefore, as in *Munnopsis*, the thorax consists of two distinct regions, an anterior under portion including the first four segments, and a posterior narrow portion consisting of the three posterior segments of the thorax.

Ischnosoma spinosum, F. E. Beddard (Pl. VI. figs. 1–5).

Ichnosoma spinosum, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 99.

The present species is represented by a single individual which is complete, with the exception of one or two of the thoracic limbs. It resembles Sars's two species, *Ischnosoma quadrispinosum* and *Ichnosoma bispinosum*, much more closely than do either of the other species described here.

The specimen measures about 6 mm. in length and is a female, with short immature ovigerous lamellæ upon the first four thoracic segments.

The anterior region of the body, comprising the head and first four segments of the thorax, is broader than the posterior region but not so long; it equals in length the three posterior thoracic segments, *plus* the single free abdominal segment; the general shape of the body is in fact precisely similar to that of *Ischnosoma quadrispinosum*.[1]

The head is very much narrower and shorter than the first segment of the thorax; the frontal margin is rounded, and at either side, in front of the articulation of the antennules, there is a short projecting lobe fringed with spines; behind this there is a deep semicircular notch where the basal joint of the antennules is fixed; there is no trace of any eyes

[1] G. O. Sars, Norske Nordhavs Exped., &c., pl. xi. fig. 26.

The first segment is much longer than either of the two succeeding segments; at the lateral margin are three long spines of which the anterior is the longest and bears two short branches at its base; the dorsal surface of this segment, as of the body generally, is roughened and tubercular; on the median lateral regions of the dorsal surface are a few spines, of which one on each side is particularly long. The two succeeding segments of the thorax are subequal; on the lateral margin are two spines, of which the anterior is the longer; there are also a few stoutish spines upon the dorsal surface of these segments. The fourth segment is longer, and as usual in this genus broader anteriorly than posteriorly, where it comes into contact with the following segment; it has a few short spines, but no long lateral spines like those of the preceding segments. The fifth segment of the thorax is as usual the longest and somewhat T-shaped, the arms of the T being at the hinder end of the segment where the limbs are articulated. Along the latero-dorsal regions of this segment, in the anterior cylindrical section, are a row of about seven short, stout spines on either side of the body. The epimera of this segment, as of the two following, are visible on a dorsal view; they are short, rounded, and tuberculate, like the rest of the body surface. The sixth and seventh segments of the thorax are very short with rounded margins, and like the preceding segment without any lateral spines.

The first segment of the abdomen is free from the abdominal shield; it is of about the same size as the last segment of the thorax, both being a trifle narrower than the sixth thoracic segment; along the lateral margins are a few short blunt spines.

The abdominal shield has a rather peculiar shape, which is characteristic of the species; the anterior margins form an oval. There is a deep notch just in front of the articulation of the uropoda which are borne upon a short truncated process; the extremity of the caudal shield is prolonged for some way behind the articulation of the uropoda, and terminates abruptly in a straight margin. The dorsal surface has a median and two lateral convexities; the former is bordered by three short spines on either side, and there are a few similar spines scattered over the lateral regions, one being especially prominent just in front of the lateral notch which precedes the articulation of the uropoda.

The *antennules* are rather peculiar in shape (see fig. 2); they consist of a large stout basal joint, with which is articulated an elongated second joint which is considerably narrower, and bears a few long slender hairs upon the inner side; the last of these is very much longer than the rest; at the summit of this is articulated an extremely minute three-jointed flagellum.

The *antennæ* (fig. 3) appear to be shorter than the body, but as a portion of the flagellum was broken off, their exact length cannot be given; the proximal joint is very short, the second long, and both these joints have a number of long, stout, rough spines; the first joint has two of these on the inner side; the second joint has two rows, one on either side

of the joint; there appeared to be three spines on the outer side and only two on the inner; the largest spine of either side was placed just before the articulation with the third joint; this is short, about one-fourth of the length of the preceding; the two distal joints of the peduncle are long and slender, and have, like the third joint, no spines; the last joint of the peduncle is longer as well as more slender than the fourth; the flagellum is multiarticulate.

The first pair of thoracic appendages were stouter and shorter than the following ones. The remaining *thoracic appendages* (fig. 4) are similar to each other; they are long and slender; the posterior pairs are not distinctly longer than the anterior pairs. They are furnished with numerous spines of varying length, which are mainly developed upon the proximal joint of the limb and disappear after the second. The spines are borne upon projections of the limb; the spine itself is distinguishable from the base, which is an outgrowth of the limb, by its transparency and yellow colour; the extremities of many of the lateral spines of the segments are tipped with a minute transparent yellow point in a similar fashion to the spines of the limbs.

The thoracic limbs terminate in a single elongated claw-like joint.

The *uropoda* (fig. 5) consist of a single stout conical joint with a few hairs scattered over its surface.

Ischnosoma spinosum is to be distinguished from its immediate allies, *Ischnosoma bispinosum* and *Ischnosoma quadrispinosum*, by the great development of spines upon the body and the appendages; the numerous other points of difference may be gathered from the foregoing description.

Station 78, off the Azores, July 10, 1873; lat. 37° 26′ N., long. 25° 13′ W.; depth, 1000 fathoms; volcanic mud.

Ischnosoma bacillus, F. E. Beddard (Pl. VI. figs. 6, 7).

Ischnosoma bacillus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 98.

This very remarkable Munnopsid closely resembles the species next to be described; it consists only of a fragment; the head and the first three thoracic segments are entirely wanting. The second species, which I have named *Ischnosoma bacilloides* on account of its close similarity to *Ischnosoma bacillus*, consists likewise of a fragment which includes precisely the same segments, viz., the four posterior thoracic segments and the abdominal shield.

The name "*bacillus*" was suggested by the rod-like form of the body, which with its elongated segments recalls the form of the body in the "walking-stick insect" *Bacillus*. Although this species, as well as the next, is so imperfect, I have no hesitation in assigning both to the genus *Ischnosoma* by reason of the oval caudal shield with its styliform uropoda and the metamorphosis (in the female) of the first pair of appendages belonging to the

abdomen into a single plate which covers the gills; the extreme length of the thoracic appendages, which are modified to form clawed ambulatory limbs, as well as the gradual decrease in size of the three posterior thoracic segments, are quite in harmony with this identification, which appears to me to be the only one possible.

The fact that in both cases the body had been broken off at the fourth segment of the thorax, suggests that the anterior segments of the thorax were in all probability broader and shorter than those which follow; if this suggestion prove to be correct the species only presents us with an exaggeration of the form of body characteristic of such species as *Ischnosoma spinosum*.

I do not wish to deny that both *Ischnosoma bacillus* and *Ischnosoma bacilloides* may ultimately be shown to be in reality identical; they however present sufficient differences to warrant their distinction as two species, supposing of course that these differences do not prove to be sexual. I am not aware of any other allied form in which such secondary sexual characters are developed.

The single specimen of *Ischnosoma bacillus* has been mounted in Canada balsam on a slide; it measures 10 mm. in length by 1 to 2 mm. in breadth. The length of the several segments which compose the fragment is as follows:—Fourth thoracic 2·5 mm., fifth thoracic 4 mm., sixth and seventh together 1·25 mm., caudal shield 1·25 mm., the above measurements give, at any rate, the right proportion between the several segments.

The fourth segment of the thorax (which unfortunately is the anterior end of the specimen) is like the rest cylindrical in form, widening out somewhat both at its anterior and posterior extremities; more particularly is this the case with the anterior region of the segment which, as shown in the figure (Pl. VI. fig. 6) is of considerable breadth, nearly as broad in fact as the segment is long; the whole segment has, therefore, the shape of a T; the two "arms" of the T are broad at their bases, where the limbs are articulated, beyond the articulation of the limbs they suddenly narrow into a long spine slightly curved forwards; these no doubt represent the epimera.

The fifth segment of the thorax is, as the above measurements imply, considerably the longest; the comparative elongation of this segment is not remarkable, because in the other species (*e.g.*, *Ischnosoma spinosum*, Pl. VI. fig. 1) the fifth segment of the thorax is also the longest. Its form resembles that of the preceding segment, only reversed; the "arms" of the T are at the posterior instead of the anterior extremity of the segment, they are equally long with those of the fourth segment, but the epimeral spine appeared to me to be straighter and not so bent as in that segment; at the point where the fourth and fifth segments articulate with each other the diameter of each is slightly wider than in the middle of the segment.

The sixth and seventh segments of the thorax are very short indeed, and together about equal the caudal shield in length. The sixth segment is the longer of the two;

it is narrower anteriorly and wider posteriorly where the limbs articulate; in neither of these segments are any spiny epimera developed.

The abdominal shield is preceded by a narrow free abdominal segment; it is more or less oval in form and rather wider anteriorly than posteriorly; the anterior region is very convex, the posterior region, which terminates in a somewhat truncated margin, is less so.

As in all other species of the genus the anus opens posteriorly at the extremity and is surrounded by soft folds of tissue. Fig. 9 of Pl. VI.[1] represents the caudal shield, viewed from beneath, to show the large aperture of the anus (α); in this as in other species the calcareous bar (b), which bounds the anus anteriorly, is in reality the homologue of the ventral plate of the last segment of the abdomen, and is of course not the telson bent downwards.

Several of the appendages have fortunately been preserved intact.

Of the fourth segment of the thorax the left hand appendage is complete; it is shown in fig. 7.

The whole appendage about equals the body of the animal in length; like the succeeding appendages it appears to be almost destitute of hairs or spines; the first two joints are moderately long and subequal; the third is short, rather less than half the length of either of the preceding; the fourth and fifth are long and slender, and the sixth joint forms a slender terminal claw. The appendages of the remaining segments of the thorax are of almost exactly the same shape and of about the same length, so that no special description of them is necessary.

The posterior thoracic appendages of this species, therefore, are like the anterior appendages, and are not modified into foliaceous swimmerets (as in *Munnopsis*). Like the body itself the appendages appear to be very fragile; the integument is very thin and brittle, and evidently much calcified.

The *abdominal appendages* do not present any remarkable features, except their small size, corresponding to the small size of the caudal shield; this being the case the thinness of the test of the animal may facilitate respiration by the general body surface.

The *uropoda* are broken on one side of the body but intact on the other; they are styliform, only consisting of one ramus; the appendage is made up of three joints, a stouter proximal joint, and a more slender distal joint, shorter as well as thinner than the preceding one with which one or two long hairs articulate.

In the figure which illustrates the species (fig. 6) I have indicated the alimentary canal, or rather its contents, to show the comparative transparency of the body.

Station 158, south-west of Melbourne, March 7, 1874; lat. 50° 1′ S., long. 123° 4′ E.; 1800 fathoms; bottom temperature, 33°·5 F.; Globigerina ooze.

[1] This figure refers to *Ischnosoma bacilloides*, but the structures depicted are the same in both species.

Ischnosoma bacilloides, F. E. Beddard (Pl. VI. figs. 8–13).

Ischnosoma bacilloides, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 99.

The present species, like the last, consists only of a fragment, which is fortunately nearly perfect so far as it goes; the fragment corresponds almost exactly to the already described fragment of *Ischnosoma bacillus;* it has lost, however, a portion of the fourth segment of the thorax, corresponding to its epimera, *i.e.*, to the arms of the T in *Ischnosoma bacillus;* so at least I am led to interpret the appearances presented by this region of the body; there is evidently a suture on either side at the anterior end of the segment, but it is not quite certain whether the broken fragments, which during the life of the animal were clearly articulated to the sutural margin, belong to this segment, or whether they are really portions of the segment in front, the fourth segment being in that case without epimera; in the latter case there will be another difference between the two species in addition to those which I shall point out in the following description.

Of this species, as of the last, there was only a single fragment obtained off the west coast of South America in 1450 fathoms; the depth at which this species lives is not widely different from that of Station 158, at which *Ischnosoma bacillus* was obtained (1800 fathoms), and the latitude is nearly the same.

The fragment measures 11 mm. in total length and the proportion of the segments is about the same as in *Ischnosoma bacillus*.

The general aspect of the body, as may be seen by a comparison of figs. 6 and 8, is exactly the same in both species.

The fourth segment of the thorax appears to be similar to that of *Ischnosoma bacillus*, but it is impossible to speak with certainty for the reasons already given.

The fifth segment of the thorax, like that of *Ischnosoma bacillus*, is the longest and has the same form as in that species; the epimeral spines, however, instead of being, as in *Ischnosoma bacillus*, directed outwards at right angles to the longitudinal axis of the body, or at most with a slight forward flexure, are unmistakably bent backwards. The sixth segment, however, presents the most striking difference between the two species, and serves at once to distinguish them; it is in fact provided with long spiniform epimera precisely similar to those upon the segment in front, and like them bent backwards, though at a somewhat greater inclination with the longitudinal axis of the body.

The seventh and last segment of the thorax is similar to that of *Ischnosoma bacillus*.

The *abdominal shield* is rather more circular in form than in the last species, and the distinction between its anterior and posterior regions is therefore more marked; the posterior region of the caudal shield as it approaches its termination is rather bent upwards. The same is the case with *Ischnosoma bacillus*. The abdominal shield is preceded as in that species by a narrow free abdominal segment. Owing to the fact that

this specimen had been kept in alcohol in a tube instead of being mounted upon a slide, the *thoracic appendages* are very much damaged, and in no one instance complete; the basal joints, however, entirely resemble those of *Ischnosoma bacillus*, so that there is little reason to doubt that the appendages were not widely different.

The present species being, unlike the last, a male, I am able to describe the modifications of the abdominal appendages in this sex, which has not yet been done for any species of the genus *Ischnosoma*. I am therefore anxious to discuss them as accurately as possible, seeing that in all probability the following description will be of the genus and not of the species only.

The first pair of abdominal appendages are shown in fig. 11 of Pl. VI.[1] from the inferior surface; these appendages are somewhat narrow and do not of course entirely roof in the cavity of the abdomen, the covering of which is completed by part of the next pair of appendages. At the upper extremity of the operculum are two minute calcified plates which seem to me to represent respectively the basipodite and endopodite of the limb, the outermost piece being the former. The operculum itself, comprising the two exopodites which fit close together but are separated by a distinct groove, is convex on its outer surface; the inner border where each piece comes into contact with its fellow is straight, the outer border curved; the lower margin is slightly incised and on the under surface as shown in the figure there is a transversely elongated aperture.

The second pair of appendages (fig. 10) are modified into a copulatory organ, which is similar in its general appearance to the same appendage in other Asellidæ (*cf. Acanthomunna*, Pl. XII. fig. 13); the penial filament, which is swollen at its base and furnished with an aperture, no doubt serving to conduct the semen, is of very great length, and is attached by a short and narrow curved joint to a large plate which probably represents the protopodite of the limb; attached to the protopodite is a delicate plate which possibly represents the exopodite (*cf. Acanthomunna proteus*, p. 50).

The penial filament and the joint by which it articulates with the rest of the limb represent the endopodite; the exopodite is a thick stout plate which lies in the natural position at the side of the central operculum, it terminates posteriorly in two longish spines of a yellow colour, one arising from the ventral the other from the dorsal side of the joint.

The third pair of appendages consist of a triangular basal joint with which are articulated a long delicate plate terminating in a filament and a thin gill lamella; I have not succeeded in separating the latter, so I have only figured (fig. 12) the basal joint and the filament, which probably corresponds to the exopodite; the latter is of very peculiar shape; it is expanded at its proximal part into an oval widish plate fringed along the outer margin with short slender hairs; it terminates in an excessively attenuated filament which is not so long as the penial filament.

[1] The figure has been inadvertently placed upside down.

I am unable to give any details respecting the two following pairs of appendages save that they are thin plates evidently serving as gills.

The *uropoda* resemble in almost every particular those of *Ischnosoma bacillus*, they are shown in fig. 13 of Pl. VI.

Station 302, south-west of Valparaiso, December 28, 1875; lat. 42° 43′ S., long. 82° 11′ W.; 1450 fathoms; bottom temperature, 35°·6 F.; Globigerina ooze.

Acanthomunna, F. E. Beddard.

Acanthomunna, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 102.

Definition.—Body everywhere densely beset with short slender spines, many of which are branched. Head short and comparatively narrow, furnished with eyes elevated on stalks like those of *Munna;* the general outline of the thorax is oval, the body being widest at the third thoracic segment. The abdominal shield is oval and very convex anteriorly, posteriorly more flattened, and terminating in a truncated and crescentic posterior margin. Antennules with four basal joints of which the third is the longest, and a long multiarticulate flagellum. Mandibles furnished with a palp. First pair of thoracic appendages sub-cheliform, the remaining thoracic appendages are long and slender, the posterior pairs longer than the anterior; the limbs terminate in a single elongated claw, and are spiny. Uropoda defective, articulated to the (apparently) dorsal surface of the caudal shield.

Remarks.—Two specimens of a deep-sea Isopod, belonging apparently to the same species, are referred to this genus; they were dredged in 700 and 1100 fathoms respectively off New Zealand. The genus is remarkable for its dense spiny covering, a condition met with in other deep-sea and cold-water Isopoda; it agrees with *Munna* in the general form of the body, in the elongated thoracic appendages, and especially in the stalked eyes; the structure of the antennules, however, and the presence of only a single elongated claw upon the thoracic appendages are distinctive marks of difference from that genus. In all probability the structure of the uropoda is different; the appendages themselves were unfortunately defective in both specimens, but the large socket upon the dorsal surface of the abdominal shield, which is evidently the point of articulation, seems to me to indicate that these appendages were far less rudimentary than those of *Munna*, and they must in any case be larger.

Acanthomunna proteus, F. E. Beddard (Pl. XII. figs. 7–14).

Acanthomunna proteus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 103.

The present species is the only representative of the genus. There are two specimens among the Isopoda collected by the Challenger, one from off New Zealand at a depth

of 700 fathoms; the other from the same locality but from deeper water (1100 fathoms). These specimens only differ from each other in colour; the larger specimen (from 1100 fathoms) is of a pale buff colour; the smaller of a rich brown, they are both males. The larger specimen measures about 7 mm., the smaller about 5 mm. in length.

The general shape of the body is much like that in the genus *Munna;* it is covered everywhere with innumerable short slender spines which are of varying size, but nowhere attain any great length; the majority are branched, and the appearance of these spines reminds one very strongly of the spicules of many sponges. A number of the spines from the thorax as well as the abdominal shield are figured on Pl. XII. figs. 8, 8*a*, 8*b*, so that their characteristic form can be seen.

The head is narrower than the following first thoracic segment; it has a pair of lateral eyes placed a little way behind the articulation of the antennæ, and elevated on stalks like those of *Munna*. The thoracic segments gradually increase in width up to the third; the diameter of the fourth segment is equal to that of the third; the remaining segments gradually diminish; the general outline of the thorax is therefore oval; the first three segments of the thorax are concave forwards, the fourth is straight and forms the transition to the three posterior segments of the thorax which are concave backwards. The antero-posterior diameter of the first four thoracic segments is subequal, the fifth is of about half the length of the fourth; the remaining segments gradually diminish, the spines are not scattered irregularly over the surface of the thorax, but are chiefly condensed upon two ridges which traverse the dorsal region of the segment from side to side. On the last three segments of the thorax the spines are confined to the lateral regions of the segments, the dorsal region being perfectly smooth and apparently without a trace of spines.

The epimera are small.

Between the last segment of the thorax and the abdominal shield is a single free abdominal segment. The abdominal shield is spiny, like the anterior region of the thorax, a row of rather long spines marking the lateral margin. The abdominal shield is very convex down to where the uropoda articulate; behind this it suddenly becomes flattened and smooth and terminates in a truncated somewhat excavated posterior margin. The uropoda are articulated just between the posterior and the anterior regions of the caudal shield, apparently on the dorsal surface; the large size of the socket of articulation of these appendages would seem to indicate that they themselves are of considerable size, and perhaps not so rudimentary as is usual in the genera belonging to this family. The anterior region of the caudal shield is divided by furrows into a median and two lateral convexities.

The *antennules* (Pl. XII. fig. 9) have a four-jointed peduncle and a long flagellum; the first joint of the peduncle is short and rounded, the second joint is equally short but more

slender, the third joint is greatly elongated and very slender, the fourth joint is of the same diameter as the third, but extremely short; the flagellum is composed of a very large number of short joints; the first joint of the flagellum is, however, of considerable length, quite as long as the six or seven following joints.

The *antennæ* are, in both specimens, broken off at the third joint, the three remaining joints are short and subequal in length, and furnished with numerous spines, which do not appear, in any case, to be branched like those upon the segments.

The *mandibles* have a well-developed palp.

Of the *thoracic limbs* the anterior pair are much shorter than the rest and subcheliform. The first joint is long and somewhat curved; its surface is comparatively smooth, the two following joints are small and subequal, together somewhat less than the first joint; the inner margin of these joints is armed with a few stout spines; the fourth joint is stout and nearly as long as the first joint; the inner margin has a row of about a dozen stout spines; the fifth joint is much shorter and more slender, and has only a few delicate spines; the last joint of the limb is shorter still and more slender, it terminates in a single short pointed claw.

The remaining thoracic appendages are similar to each other in structure; one of these is shown in fig. 10; they differ principally from the anterior pair of limbs in the comparative shortness of the basal joint, and in the great elongation of the fourth and fifth joints. All these limbs are, in consequence, considerably elongated, but there is a slight difference in length between the more posterior and the more anterior pairs, the former being the longer.

In any of these appendages the first joint is longer than the following joints which are subequal; the fourth and fifth joints are immensely elongated, the latter being the longer as well as the more slender, the proportionate length of these two joints to the other joints of the limb increases in the posterior appendages; the sixth joint is short and bears a single slender claw at its extremity. The limbs are very spiny, more particularly the fourth and fifth joints; the spines are borne on short tubercles and are never branched like those which deck the thorax and abdomen. The appendages are also finely granulated like the general body surface.

In figs. 11, 13, and 14 I have illustrated the three anterior pairs of abdominal limbs (of the male).

The first pair were unfortunately broken in detaching them from the animal. They consist of two flattened, closely applied oblong plates, the lateral margins of which are fringed anteriorly with slender hairs. The posterior extremity of this appendage is shown, more highly magnified, in fig. 12; the postero-lateral margin projects slightly, and this region of the appendages (*b*) is grooved, being evidently rolled up in a scroll-like fashion, the open lips of the groove are beset with slender hairs; anteriorly these hairs are set in tufts, radiating outwards from a common centre. The posterior

and median portion of the appendage also projects in a rounded extremity fringed with comparatively long slender hairs; this part of the appendage forms a somewhat raised pad which is largely covered with delicate (sensory ?) processes, shown at *a*; beneath the integument is a granular mass of tissue (*gb*) in which no structure was discernible, but which may be a nervous ganglion. The above description refers to the appendages when seen from the under surface.

I suppose that these conjoined plates represent the endopodite of the limb; the exopodites are formed by a somewhat oval plate on either side, which completes the roofing in of the infra-abdominal cavity.

The second pair of appendages (fig. 13) are evidently, like the first pair, modified to subserve the generative function; the penial filament is of very great length and projects beyond the termination of the abdomen; at its base it is somewhat swollen and articulates with a stoutish joint, which is again attached by a smaller joint to a thin plate, and this I imagine to represent the protopodite of the limb; the joints at the base of the penial filament, judging by other Isopoda, would represent the endopodite; the basal joint of the limb is long and flattened and somewhat curved, terminating anteriorly and posteriorly in a pointed extremity; its outer margin is fringed with slender hairs.

The exopodite is represented by a slender, soft, conical filament, which is covered for the greater part with short delicate hairs.

Fig. 14 represents one of the third pair of appendages, a portion of which is probably defective; the exopodite (?) consists of two flattened joints fringed along both margins with short slender hairs; the second joint is pointed at its extremity and terminates in a long slender hair; the endopodite is a respiratory lamella, broad and long, with three long plumose setæ at its lower margin; the fourth pair of appendages are entirely respiratory. The *uropoda*, as already mentioned, are defective.

Station 168, off New Zealand, July 8, 1874; lat. 40° 28′ S., long. 177° 43′ E.; depth, 1100 fathoms; bottom temperature, 37·2 F.; blue mud.

Station 169, off New Zealand, July 10, 1874; lat. 37° 34′ S., long. 179° 22′ E.; depth, 700 fathoms; bottom temperature, 40·0 F.; blue mud.

Family Munnopsidæ.

Munnopsis, M. Sars.

Munnopsis, M. Sars., Forhandl. Vidensk. Selsk., 1860, p. 84.

The family Munnopsidæ and the genus *Munnopsis* were instituted by Professor M. Sars for the reception of an Isopod dredged by him in moderately deep water off the coasts of Norway. This species, *Munnopsis typica*, was described in a detailed fashion by Professor M. Sars, the description being accompanied by numerous illustrations; the

same genus and species has been met with since, not only off the coasts of Norway, but also in the Arctic Ocean, by many of the exploring expeditions which have investigated the marine fauna of the extreme north; the species was obtained during the voyage of the "William Barents" in great abundance, and it has been figured by Dr. Max Weber in his account of the Isopoda obtained during that voyage. Dr. Oscar Harger[1] has recorded *Munnopsis typica* from the shores of North America. Three distinct species of Munnopsids, obtained during the voyage of the Challenger, I refer to this genus; two species were obtained from the southern hemisphere and from very deep water; *Munnopsis australis* was dredged at Station 146, off Prince Edward's Island, and *Munnopsis gracilis* considerably further to the east, off the shores of New Zealand, in 1100 fathoms. The third species comes from the northern hemisphere, near to Japan, in 345 fathoms of water; but I am more doubtful about assigning it to this genus. The definition of the genus *Munnopsis* is given below; I have altered it from Sars's original definition so as to include the two species described in the present Report.

Anterior division of the body dilated, posterior suddenly much narrower and linear. Four anterior thoracic segments excavated above, obtusely rounded at the sides; the three following subcylindrical, with short acuminate lateral processes. Abdominal segment elongate, much longer than broad. Antennules with the basal joint large and flattened, the flagellum elongate and multiarticulate; antennæ very long and slender, many times longer than the body; the two last peduncular segments greatly elongated; the flagellum about equal in length to the peduncle; mandibles subtriangular, entire and acuminate at the apex, without a molar process; the palp absent or if present slender; its last joint thick at the base and curved in the form of a hook; of the first four pairs of thoracic limbs the first pair are short; the second pair not much longer, rather robust and subprehensile in the males; the two following pairs greatly elongated and very slender, many times longer than the body, but with the basis, ischium and meros very short; last three pairs of legs natatory, all alike, with the last two segments foliaceous, margined with long slender delicately plumose setæ; abdominal operculum large, nearly covering the whole under surface of the abdomen; suboval, simple in the female, but consisting of three distinct segments in the male, one median and very slender, and two lateral, and furnished within with a peculiar curved organ, terminating behind in a much elongated seta (as in *Eurycope*); caudal appendages slender, simple.

Munnopsis gracilis, F. E. Beddard (Pl. XIV. figs. 9, 10).

Munnopsis gracilis, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 916.

Off the North Island of New Zealand, at Station 168, from a depth of 1100 fathoms, a small *Munnopsis* was dredged among a very large number of specimens of *Eurycope novæ zelandiæ*.

[1] Marine Isopoda of New England, *loc. cit.*, p. 329.

The present species is a true *Munnopsis* by reason of the broad anterior region of the thorax and the narrow posterior region; it agrees closely with *Munnopsis latifrons*, *Munnopsis typica*, &c.

The single specimen is a male and measures 12 mm. in length.

The head is small and is deeply sunk into the first thoracic segment, the region between the antennæ and antennules of either side is wide, as in *Munnopsis typica*, though perhaps not so wide as in *Munnopsis latifrons*.

The first segment of the thorax is very narrow; the second is quite the largest of the four segments; on a lateral view (see Pl. XIV. fig. 9) this segment is seen not only to have a considerably greater antero-posterior diameter than the preceding or the succeeding ones, but also a greater vertical extension; its dorsal surface is strongly arched, and is raised some way above the general body surface.

The third and fourth segments are subequal and each rather smaller than the second; the transverse diameter of the third segment is about equal to that of the second, and here the body of the Crustacean is widest; the fourth segment of the thorax is distinctly narrower; the hinder margin of the third and fourth segments are concave, that of the fourth particularly so.

The rest of the thorax is very much narrower than the anterior region; of the three segments of which it is composed, the first is considerably the longest; the second and third are short and subequal.

The abdominal shield is long and narrow, and terminates posteriorly in two short projections on either side of the median line, to the outside of which the uropoda are attached.

Along the median line of the abdominal shield is a raised convex area, which narrows gradually towards the posterior extremity; on either side of this is the lateral convex area.

This species comes nearer to *Munnopsis typica* than either of the following; an obvious distinction between the two species is the absence in *Munnopsis gracilis* of any spiny processes such as are found on certain of the segments of *Munnopsis typica;* furthermore, the fifth segment of the thorax is distinctly longer than either of the two succeeding ones, though not so markedly so as in *Munnopsis australis*. In *Munnopsis typica* these segments are more equal in length.

The illustrations of this species are from drawings by the late Dr. v. Willemoes-Suhm.

Station 168, off New Zealand, July 8, 1874; lat. 40° 28′ S., long. 177° 43′ E.; depth, 1100 fathoms; bottom temperature, 37°·2 F.; blue mud.

Munnopsis australis, F. E. Beddard (Pl. XIII. figs. 1–11).

Munnopsis australis, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 917.

This species, of which I have been able to study a single example mounted on a slide in Canada balsam, agrees with *Munnopsis typica* in that the three posterior segments of the thorax are considerably narrower than those which precede them; *Munnopsis australis* is in other respects not very dissimilar from *Munnopsis typica*. The present specimen is a female, and was dredged from 1600 fathoms between Prince Edward's Island and the Crozets.

It measures 8 mm. in length, exclusive of course of the enormously elongated antennæ, which measure themselves at least 36 mm.

The head is comparatively narrow in proportion to its length; its general outline is in fact oval, though the anterior margin is straight and abruptly truncated; the region between the insertion of the antennæ is very wide, quite as much so as in *Munnopsis latifrons* and *Munnopsis typica;* a semicircular process extending a little over the articulation of the antennules on each side is shown on fig. 1.

The first segment of the thorax is extremely narrow especially dorsally; it widens out laterally to nearly the width of the succeeding segments of the thorax; the segment closely embraces the head, and is in consequence almost V-shaped, the concavity being of course anterior; the second segment of the thorax is five or six times as long as the first and subequal to the two next; at the second segment the body of this species is broadest, gradually decreasing in breadth both before and after this segment; the shape of the thoracic segments gradually alters from the first to the fourth; the V-shaped form so conspicuous in the first becomes less and less marked in the remaining segments, the fourth being almost straight, with sub-parallel anterior and posterior margins.

All the segments of the thorax are furnished with epimera which, although visible on a dorsal view of the animal, are not large; their margins are not prolonged into spiny processes as they so often are in the species of this family. The remaining segments of the thorax, together with the caudal shield, form a narrow cylindrical section of the body which contrasts very much in this respect with the anterior region, being not more than perhaps one-half its width; the three segments of the thorax, although about equal in width, differ very much from each other in length, that is to say, the anterior segment differs very much from the sixth and seventh; it measures at least three times the length of either of these, which are both short and subequal; I am not certain as to the lines of demarcation between these latter segments, which I could not detect in the specimen.

The abdominal shield is long and narrow and has very much the form of the abdominal shield in *Idothea*. It terminates posteriorly in a somewhat conical process which is upturned; the upper surface appears to be regularly convex.

It has been already stated that the present specimen is a female; the identification of

the sex depends upon the presence of what I believe to be a pair of ovigerous lamellæ attached near to the bases of the third pair of thoracic appendages. One of them is shown in fig. 10; it is a thin plate projecting inwards from the surface of the thorax, just inside of the articulation of the appendage; the shape of the lamella can be understood by an inspection of the figure; it is somewhat concave anteriorly and convex inwards and posteriorly; along the margin are a series of grooves giving to this region a tessellated appearance. I could not find any trace of an ovigerous lamella on any other segments of the body; the remarkable disposition of the ovigerous lamella in *Tanais willemœsii* from Kerguelen, described by the late v. Willemoes-Suhm, and more recently by Studer, prepares us for abnormalities in this respect in Isopoda from that region of the globe; it may be, however, that the other ovigerous lamellæ have not yet appeared owing to the immature condition of the specimen, though this is not generally the case with Isopoda; it is also possible, but not probable, that this structure does not correspond with the ovigerous lamellæ.

The *anteïnules* (fig. 2) are articulated with the head by a stout basal joint of cylindrical form; the dorsal region of the first joint is prolonged some way beyond the articulation of the next joint, which is considerably smaller; the fourth and fifth joints are very small. The flagellum is long, about three times as long as the basal region of the antennule; it appears to be perfectly smooth proximally and gradually becomes more and more ringed, until it is evidently made up of a number of separate joints; the sensory filaments are restricted to the distal region of the appendage.

The *antennæ*, as already observed, are remarkably long even for a genus which is characterised by the length of the antennæ; the proximal joints are as usual extremely short and subequal in length. The fifth joint measures alone no less than 15 mm. Only the distal one-sixth of the joint is occupied by the muscles, which effect the movement of the succeeding joint (see fig. 3); the latter is comparatively very short; the long flagellum measures in the example before me 17 mm., but the extremity is evidently lost, so that it is impossible to calculate how much longer it was during life; the flagellum shows traces of division into separate joints, which appear to be very long.

The *mandibles* differ somewhat from the typical form of the mandibles of other Munnopsids. The specimen itself is labelled in the handwriting of v. Willemoes-Suhm as a doubtful Munnopsid, and it is possibly these very appendages, which are conspicuous and readily to be made out, which led v. Willemoes-Suhm to hesitate before including the species in the genus *Munnopsis* or its immediate allies.

In fig. 8 of Pl. XIII. I have figured one of the mandibles; it is a conical stout appendage slightly curved inwards towards its fellow; the biting edge is prolonged into a stout tooth distinguishable from the rest of the appendage by its yellow colour, behind which are traces of other teeth in the way of slight crenulations of the margin; the asymmetry between the two mandibles is not very striking; the most remarkable fact,

however, about these appendages is the total absence of any mandibular palp, a fact which at once distinguishes this species from its congeners. It is stated by Sars that the genus *Macrostylis* is characterised, among other peculiarities, by the want of a mandibular palp, which is also occasionally absent in *Ilyarachna* and *Desmosoma;* this fact made me hesitate before including the present species in the genus *Munnopsis.*

The shape of the mandible, apart from the absence of a mandibular palp, is not unlike that of *Eurycope gigantea*, or indeed of *Munnopsis typica.*

The *maxillæ* I am quite unable to describe, as they were hidden by the maxillipedes; the value of the results likely to be obtained by figuring and describing these appendages did not appear to me to be at all commensurate with the injury to the unique specimen which would be caused by unmounting it and teasing out the appendages.

The *maxillipedes* again are unlike the typical form of these appendages in the Munnopsida generally, owing to the unusually large size of the third joints of the palp. One of these appendages is displayed in fig. 9; along the margin of the stipes are two sensory processes.

The *thoracic appendages* of the first four pairs appear to be similar in structure, but I am unable to speak with anything like certainty, because only three of these limbs were preserved, the first and second on the left side and the second only on the right-hand side of the body.

The first appendage is displayed in figs. 5 and 6; the first pair of appendages are more slender than the second, but otherwise are more or less similar in form; the first joint in each is the longest, the second is somewhat shorter, and the third is extremely short; this joint and the next two are beset with stiffish hairs, which appear to be proportionately stronger in the first appendage than in the second.

The third and fourth appendages on both sides of the body were broken off close to their articulation; they are evidently larger than the preceding appendages; they also appear to resemble the same appendages in *Munnopsis typica* in the shortness of the proximal joints of the third and fourth thoracic appendages as compared with the two preceding limbs.

The three posterior pairs of thoracic appendages (fig. 7) resemble those of other Munnopsidæ in the modification of the distal joints; these, however, do not seem to be so much widened and flattened as in other species.

The *uropoda* (fig. 11) are short and uniramose; they are two-jointed, the distal joint being longer than the proximal although more slender.

Although I believe I am right in assigning this species to the genus *Munnopsis*, it differs in many important particulars from *Munnopsis typica.* The most striking difference perhaps is in the absence of a mandibular palp; but as this structure is not always constant in a particular genus (it is for example sometimes absent and sometimes present in *Desmosoma*) its absence in *Munnopsis australis* does not necessitate the removal

of that species to another genus. Apart from the absence of a palp the shape of the mandible is by no means unlike that of *Munnopsis typica*. The great length of the fifth segment of the thorax is a character which at once distinguishes this species from *Munnopsis typica* where the three posterior segments of the thorax are about equal. Other points of difference will be apparent on comparing my description and figures of *Munnopsis australis* with those of *Munnopsis typica*.

Station 147, off Marion Island, December 30, 1873; lat. 46° 16′ S., long. 48° 27′ E.; depth, 1600 fathoms; bottom temperature, 34·2 F.; Diatom ooze.

Munnopsis latifrons, F. E. Beddard (Pl. X. figs. 1–4).

Munnopsis latifrons, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 917.

A single female example of this species was dredged to the east coast of Japan, in 345 fathoms.

It is a small species, measuring about 15 mm. in length, but unfortunately rather damaged owing to the soft character of the integuments, which are but little calcified, though brown and opaque, and not transparent as in the remarkable *Eurycope pellucida* (see p. 71).

The head is very large in proportion to the other segments; it is as long as the first three segments of the thorax taken together; as the antennæ and the antennules are comparatively small at the base and widely separated, the frontal region of the head, which is of course bent downwards at right angles to the rest of the head, is very broad, much broader than in any other species known to me; in *Eurycope sarsii*, for example, there is only a very narrow bar separating the bases of the antennæ and representing the frontal region of the head. The upper surface of the head has a tumid, swollen appearance, and is covered with minute punctulations.

The anterior thoracic segments appear, on a dorsal view, to be subequal in size; the lateral regions, however, increase progressively in size from before backwards, the first segment being the shortest and the fourth the longest; the dorsal portion of the segments, as in so many other species, is saddle-shaped, the lateral region of the segments is convex. The epimera are present though small, but are not prolonged into spines as in many species of *Eurycope*.

The three posterior segments of the thorax differ from the same segments in other species by reason of their relative disproportion; the first of these segments is very decidedly the smallest, its antero-posterior diameter not being more than one-third of either of the two remaining segments of the thorax; this statement, however, only refers to the dorsal region of the segment; laterally all three segments are of equal breadth. The sixth and seventh segments of the thorax are, as already mentioned, considerably longer dorsally than the fifth, and are subequal. The surface of these segments is

traversed by numerous shallow lines dividing them into a number of slightly separated convexities.

The posterior margin of the sixth segment is not regularly concave as in other species (*e.g.*, *Eurycope sarsii*), but the line of division between it and the seventh segment runs straight and transverse to the longitudinal axis of the body throughout the dorsal region of the segments; this brings about the equality in size between the last two segments of the thorax.

The abdominal shield was, unfortunately, considerably damaged, so that its shape cannot be described with great accuracy; it appears to be more or less oval in form and truncated at its free extremity; laterally and just in front of the articulation of the long styliform uropoda is a spiny process directed backwards, nearly in the same straight line with the longitudinal axis of the abdominal shield.

The *antennæ* are of great length, measuring 87 mm., six times the length of the body of the animal; the last two joints are the longest, measuring respectively 38 and 42 mm.; they have a few stout spines scattered over the surface; the flagellum is a straight rod not divided at all into joints, it measures only 5 to 6 mm.

The *first pair of thoracic appendages* (fig. 3) form a very distinct prehensile hand; the two basal joints are long and subequal, the third joint is very short, the fourth and fifth are moderately short, the former somewhat swollen, the fifth is bent upon the fourth joint, and there is a small claw-like sixth joint; the inner edge of the third and fourth joint is furnished with numerous spines.

The next three pairs of thoracic appendages were lost.

The three last pairs are natatory and similar to each other. Each of these limbs is of considerable length, about as long as the body; there appears to be, as in *Munnopsis typica*, no terminal claw.

The abdominal operculum covers over the abdomen below.

The *uropoda* (fig. 4) are long and styliform, almost as long as the caudal shield itself; each is composed of two joints, which are furnished with long simple hairs.

I include this species for the present within the genus *Munnopsis*, though I am quite aware that exception might be taken to this view of its affinities; the general form of the body appears to be more that of *Munnopsis* than of any other genus except *Desmosoma;* on the other hand, the posterior segments of the thorax are by no means so narrow relatively to the anterior section of the body as they are in the other species of *Munnopsis*. The form of the uropoda is typical of *Munnopsis*, but also of *Desmosoma*. The very "*prehensile*" character of the first pair of thoracic appendages appears to be peculiar to the species; it certainly is not found in *Eurycope* and *Munnopsis*, and apparently not in the other genera belonging to this family.

Station 232, off Ino Sima Island, Japan, May 12, 1875; lat. 35° 11′ N., long. 139° 28′ E.; depth, 345 fathoms; bottom temperature, 41°·1 F.; green mud.

Eurycope, G. O. Sars.

Eurycope, G. O. Sars, Om en anormal gruppe af Isopoden, Forhandl. Vidensk. Selsk., 1863, p. 208.

Of the fourteen species of Munnopsidæ dredged during the voyage of the Challenger, I have referred eight to the genus *Eurycope*. Certain of these species, viz., *Eurycope novæ-zealandiæ*, *Eurycope fragilis*, *Eurycope intermedia*, and *Eurycope atlantica*, are, I am convinced, rightly placed in this genus. The remaining species I have preferred for the present to include in this genus, until the examination of more specimens enables certain doubtful points in their structure to be determined; a characteristic feature of the genus *Eurycope*, as opposed to *Ilyarachna*, is the form of the posterior thoracic appendages; in *Ilyarachna* the first two pairs of these appendages are entirely similar to those of *Eurycope;* the last pair, however, are not natatory but ambulatory limbs. Such a point as this I have been quite unable to determine in the species referred to, as well as many other anatomical features which distinguish *Eurycope* from *Ilyarachna* and *Desmosoma*, owing to the imperfect condition of the specimens; I do not therefore pretend to fix definitely the systematic position of these species, merely placing them in the genus *Eurycope* as a matter of convenience, and because there is nothing in their organisation, so far as I have been able to study it, which is at variance with such a determination. Sars's definition of *Eurycope* is as follows :— .

Body depressed, oval when seen from above, almost equally narrowed at the anterior and posterior extremities. Head moderately large, somewhat projecting between the antennæ, and often furnished with a distinct rostrum. First four segments of the thorax subequal, short, hollowed out above; three posterior segments convex above, larger, but not narrower than the preceding; abdominal segment moderately large, broader than long, obtusely rounded at the extremity. Lower antennæ very slender and greatly elongated, three or four times as long as the body, the flagellum longer than the peduncle. Mandibles powerful in structure; mandibular palp moderately large, three-jointed, last joint swollen at base and curved like a claw. Legs of the first pair much shorter than the rest, narrowed, non-prehensile, the last joint forming a short thick claw; following pairs of legs subequal, very elongated, with a long terminal claw; three posterior pairs of legs natatory, penultimate and antepenultimate joints dilated and compressed, and fringed with numerous plumose setæ; last joint narrow and styliform. Abdominal operculum subpentagonal, with rounded angles, much shorter than the abdominal segment. Caudal appendages short, biramose, with one-jointed branches.

Eurycope sarsii, F. E. Beddard (Pl. XI. figs. 1–12).

Eurycope sarsii, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, part iv. p. 919.

At Station 146, from a depth of 1375 fathoms, two specimens were dredged of a large species of Munnopsid, apparently new to science.

I take the opportunity of naming this species after Professor G. O. Sars, who has so largely increased our knowledge of this as of other families of the Crustacea.

The specimens in question are a male and a female. The female is rather the larger of the two, measuring 24 mm. in length, by 11 mm. in greatest breadth; the difference in length between the two specimens appears to be entirely owing to the fact that the anterior thoracic segments are longer than in the male to make room for the attached ovigerous lamellæ. Otherwise the two sexes appear to present no recognizable differences.

The species was also obtained at Station 147, from a depth of 1600 fathoms.

In no case, unfortunately, are any of the thoracic limbs or the antennæ preserved, a fact which is to be the more regretted, as the modifications of the thoracic limbs are precisely those characters which have largely served Professor Sars as a means of dividing the group into its several genera. It is not the possibly rough handling of the specimens themselves when being transferred to spirit that has injured them in this way; some manuscript notes by Dr. v. Willemoes Suhm state that this species was never dredged with its limbs complete. As it is, in all the specimens, five in number, there are only the first joints of the ambulatory appendages left adherent to the body.

The head segment is about equal in size to that of any of the anterior segments of the thorax.

The first four segments of the thorax are of about the same antero-posterior diameter, the fourth alone being rather narrower than the three which precede it.

The breadth of these segments, their diameter from side to side, progressively increases so that the fourth is the widest; the anterior margin of each is rather concave forwards, the posterior margin convex backwards; the fourth segment, however, has its two margins approximately straight and parallel; the posterior margin is slightly concave instead of convex; this segment, in fact, forms the middle point of the body, in front of it the segments are curved forwards, behind it they are curved backwards.

The upper surface of the body is entirely devoid of spines or tubercles of any kind, which are often characteristic of other species of the genus.

Each of the four anterior thoracic segments is somewhat saddle-shaped, its anterior and posterior margins being produced into a ridge, and the central part between the two ridges depressed; laterally, the posterior ridge widens out into a triangular convex area which occupies the whole of the segment just behind the articulation of the epimera; this convex area does not, however, become fused with the anterior ridge of the segment, but remains distinct from it; the latter terminates on either side in a short, forwardly directed, spiny process, which becomes progressively longer in the segments passing from before backwards, and is indeed hardly visible in the first segment of the thorax.

The epimera of these segments are conspicuous; a transverse line of division, approximately parallel to the transverse axis of body, divides each epimeron into two halves, an anterior and a posterior; the former is produced into a longish spiny

process parallel to that on the tergum; these spines are longer in the successive segments.

The posterior region of the thorax differs from the anterior in the direction of its segments as well as in their form.

Each of the three segments which are comprised in this region of the thorax, are considerably stouter than any of the anterior ones; their margins, instead of being concave forwards, are convex forwards and concave backwards; each segment, in fact, appears as if composed of two approximately straight pieces meeting in the middle line at any obtuse angle; in the last of the three segments the posterior margin is less curved than in either of the preceding segments; this segment comes therefore to be triangular in shape and considerably longer antero-posteriorly than the rest.

The abrupt transition between the fourth and fifth segments of the thorax, which can be understood by an inspection of fig. 1 of Pl. XL, implies a comparatively limited surface of articulation between the two, and, as a natural consequence, the slightest rough handling causes the body to break at this point.

The transverse diameter of the three posterior thoracic segments decreases progressively from before backwards, so that the third is the narrowest; each segment is traversed by a median furrow which divides it into right and left halves; the anterior boundary line of the segment dips in slightly at the commencement of this furrow, which is deeper in the first than in either of the two succeeding segments; the rest of the segment in every case is convex, with the exception of a narrow anterior and posterior boundary line which is flattened and somewhat upturned; the anterior flattened margin is produced at the lateral extremity of the segment into a forwardly directed spiny process like those of the anterior thoracic segments, but longer; these processes are subequal on all the three segments; behind this process the lateral margin of each segment is produced into a minute triangular process at the base of each of the larger spines; between this process and the hinder margin of the segment is situated the epimeron, which is extremely small and decreases in size from before backwards.

The abdominal segments, as in all other species, are fused together to form a shield, at the termination of which the anus opens, so that there is no telson.

The abdominal shield is roughly triangular in outline with convex margins; the lateral margins are produced forwards beyond their junction with the anterior margin into a short spinous process, which corresponds with those of the thoracic segments. The dorsal surface is divided into three areas—two lateral somewhat reniform convexities which commence at the anterior but do not reach the posterior margin of the shield; in the "hilum" of each of these convexities is a minute oval convexity. The surface of these lateral convexities is punctulated.

The middle of the abdominal shield is occupied by a narrow area which is T-shaped,

inasmuch as the lateral convexities do not reach to its extremity; this area is smooth and less convex than the lateral areas.

The posterior portion of the caudal shield is bent downwards in the way indicated in fig. 2, which is a lateral view of the body of this species.

The *antennules* are moderately long and have the ordinary structure.

The *antennæ* are broken off at the fourth joint in all five specimens.

The *mandibles* are displayed in fig. 3; the basal joint is furnished at its tip with numerous strong spines, below which is a tuft of slender hairs; the molar process is beset with numerous hairs; the palp is long and three-jointed; the terminal joint is set with its long axis transverse and is somewhat clawed at the apex, where there are numerous fine hairs.

The *maxillæ* (figs. 4, 5) are much like those of other species.

The *maxillipedes* are shown in fig. 7; the outer plate is rather narrow and somewhat pointed at its extremity where there are a few slender hairs, the stipes alone terminates in a truncated extremity, furnished with numerous serrate spines and slender hairs, these latter extend some way down the inner margin of the joint, along the inner margin are about 10 rounded sensory processes, several of which are shown more highly magnified in figs. 8–10. All the appendages of this species are from v. Willemoes-Suhm's drawings.

Station 147, off Marion Island, December 30, 1873; lat. 46° 16′ S., long. 48° 27′ E.; depth, 1600 fathoms; bottom temperature, 34°·2 F.; Diatom ooze.

Eurycope novæ-zelandiæ, F. E. Beddard (Pl. IX. figs. 1–7).

Eurycope novæ-zelandiæ, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, part iv. p. 918.

This species resembles in many particulars *Eurycope sarsii*, but may be distinguished from it by the spines on the dorsal surface of the body.

It is also a considerably smaller species, the largest examples measuring only 12 mm. in length.

A larger number of individuals of this species was dredged by the Challenger than of any other. It was only met with off the North Island of New Zealand, in 1100 fathoms.

The head is smooth and narrower than the first segment of the thorax.

The thoracic segments gradually increase in width up to the fourth, which is the widest; the first segment is shorter than the succeeding ones which are subequal. These segments are excavated dorsally by a shallow transverse fossa. In the median dorsal line of the second to the fourth segments inclusive is an upright spiny process directed somewhat forwards; this process is longest in the second segment and diminishes in length in the succeeding ones.

Laterally the margins of the third and fourth segments are prolonged into a short forwardly directed spine; the epimera of these, as of the preceding segments, are furnished with two spines similar to that upon the tergum.

The three posterior segments of the thorax are closely appressed together and separated by a considerable interval from the anterior region of the thorax. These segments, together with the abdominal shield, form a pear-shaped region, the apex being directed backwards; these segments, moreover, are convex above, and of equal antero-posterior diameter. They have indications of a pair of dorsal spines, which are well developed in *Eurycope fragilis;* their antero-lateral margins are directed forwards as shown in the figure which illustrates this species (Pl. IX. fig. 1).

The abdominal shield is roughly triangular in form; between its concave anterior border and the concave posterior border of the segment in front is an area traversed by one or two longitudinal furrows; this probably corresponds to the fused terga of the two or three anterior segments of the abdomen.

The abdominal shield terminates posteriorly in an obtusely pointed extremity; anteriorly to this on each side is a short lateral process, situated just above the articulation of the uropoda; the antero-lateral margins of the abdominal shield are slightly prolonged into processes which correspond with those upon the segments in front.

The dorsal surface is convex and divided by two shallow longitudinal furrows into three areas, one median and two lateral.

The *antennules* are of considerable length and consist of five joints and a terminal flagellum. The first joint is much the largest, and, as is usual, is prolonged into a flat process beyond the articulation of the second joint; the second joint is considerably more slender and shorter than the first joint; the third joint is of nearly equal length with the second, but much narrower; the fourth joint is extremely short, the fifth is as long as the third; the flagellum consists of a very large number of joints, which become longer as well as more slender towards its tip.

The *antennæ* are rather more than twice the length of the body, the proximal joints are very short, the two distal joints are of extreme length and subequal.

The *mandibles* (Pl. IX. figs. 3, 4) closely resemble those of *Eurycope sarsii;* the palp is long and three-jointed; the terminal joint is curved in the form of a claw; the cutting edge of the mandible is furnished with five or six tooth-like processes of unequal size among which are a few scattered hairs, below is a thick tuft of slender hairs; the molar process is stout with a blunt edge.

In the first pair of *maxillæ* the inner blade is very slender, with a few slender hairs at its apex and no stout spines like those at the outer blade.

The *maxillipedes* appear to resemble entirely those of *Eurycope sarsii* (see Pl. XI. fig. 7).

The *thoracic appendages*, as in all the other species of this genus, are specialised into two series, the four anterior pairs being ambulatory, the three posterior natatory.

The four anterior pairs gradually increase in length from before backwards, the first being the shortest and the fourth the longest. The measurements in an example chosen at random are as follows :—

First pair 6 mm., second pair 13 mm., third pair 20 mm., fourth pair 25 mm.

The structure of the limbs in every case is nearly identical.

The two basal joints are comparatively short and stout, the third is very short; the fourth and fifth are again long, and the limb terminates in a short pointed joint.

In the first pair of appendages the terminal claw is bent and very short, the fourth and fifth joints are hardly longer than the first; in the succeeding appendages the fourth and fifth joints are very considerably longer than the first, and the terminal joint is long and straight.

The posterior thoracic appendages (fig. 5) have the penultimate and antepenultimate joints flattened and widened, and fringed with long plumose hairs.

The *uropoda* are very minute and biramose; the inner branch is much shorter and more slender than the outer branch, which is still more slender than though equal in length to the basal joint.

Station 168, off New Zealand, July 8, 1874; lat. 40° 28′ S., long. 177° 43′ E.; depth, 1100 fathoms; bottom temperature, 37°·2 F.; blue mud.

Eurycope fragilis, F. E. Beddard (Pl. IX. figs. 8–12).

Eurycope fragilis, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, part iv. p. 920.

A number of individuals from four distinct stations appear to be referable to one species, which differs from those already described. The largest specimen, which is unfortunately greatly damaged, was dredged in the Southern Ocean, from a depth of 1260 fathoms; four other considerably smaller examples were dredged in the Pacific, off the coast of Japan, in 1875 fathoms; another specimen, also small, was dredged in the Southern Ocean at Station 147, and a fourth locality is Station 158, where a single specimen was obtained. The distribution of this species is therefore wider than of any species belonging to this family, with the exception of *Eurycope atlantica*. *Eurycope fragilis* has its nearest allies in *Eurycope intermedia*, *Eurycope novæ-zelandiæ*, and *Eurycope atlantica*, but it may be easily distinguished from both by the long, forwardly curved, lateral spines of the caudal shield; and by the absence of a long spine upon its upper surface, which is characteristic of *Eurycope atlantica* (see p. 66–67, and Pl. IX. fig. 13).

The largest specimen, that from 1260 fathoms (Station 152), measures 30 mm. in extreme length; as it is so damaged, particularly in the region of the thorax, the following description of the species is based upon the other individuals, which are much more perfect. It may be just open to doubt whether the large individual from Station 152 is in reality the same species as the small individuals; as the former is so incomplete I prefer to consider it for the present as really belonging to the same species, especially since it agrees, in all ascertainable characters, with the smaller specimens

from Stations 147 and 237. The distribution, geographical and bathymetrical, of this species is of some little interest, and is, I venture to think, confirmatory of an opinion which I have elsewhere expressed, respecting the distribution of the deep-sea Isopoda.

In my report on the genus *Serolis*[1] I pointed out that the distribution of two species, *Serolis bromleyana* and *Serolis antarctica*, was confirmatory of Gerstaecker's view that, to the south as well as to the north of the equator, the depth at which a species is found increases progressively with its distance from the equator.

The distribution of *Eurycope fragilis* does not bear out this view at all, but does support my own view that the size of the individuals increases as the species passes south. The specimen of *Eurycope fragilis* from Station 152 is three times the size of any of the specimens dredged at Station 237, while the single specimen from Station 147 is not only intermediate in geographical position, but also in size between the other specimens. So possibly with *Eurycope atlantica*, if I am right in assigning the fragment from Station 147 to that species; the individual from the North Atlantic is considerably smaller than that from Station 147; in this instance increase of size is correlated with the increase of depth in the habitat, but I am not inclined to lay any stress upon this relation as it is not borne out in the other species.

The largest specimen, that from Station 152 (1260 fathoms), measures 30 mm. in length; the individual from Station 147 measures 17 mm. in length, that from Station 158 about the same; the largest of the series of small individuals from Station 237 measures only 12 mm.

The following description of the species is, as already stated, based upon these smaller specimens, because they happen to be better preserved than any of the larger individuals.

The head is long, but narrower than the first segment of the thorax; the first four segments of the thorax are subequal in antero-posterior diameter, but increase gradually in breadth; the second, third, and fourth of these segments, or the third and fourth only, have a longish spine in the median dorsal line. The antero-lateral margins of the segments are prolonged into a short, forwardly directed spine, in the third and fourth segments only; the epimera of all these segments are furnished with a long spine, considerably longer than that of the tergum, but following the same general direction; in the first two segments of the thorax there is only one epimeral spine; in the three succeeding segments there is an additional shorter spine.

The three posterior segments of the thorax have the form which is characteristic of the genus; the body of the species is widest at the first of these segments.

On the ventral surface of the thoracic segments are a number of short spines; on each of the first four segments is a single short spine in the median line; these increase in length progressively from the first segment backwards; there are a series of similar spines, but apparently stouter, upon the last thoracic segments, and one short conical

[1] Zool. Chall. Exp., part xxxiii. p. 82.

tubercle upon the median line of the abdominal operculum. The posterior and ventral margin of the abdominal shield has also three strongly marked tubercles, one median and two lateral.

On the dorsal surface of each of the three posterior segments, on either side of the median line, is a longish spine; the lateral margins of the segments are prolonged into a curved spine-like process, which are considerably more conspicuous than those of the anterior segments. They are also longer in the case of the fifth than in either of the two succeeding segments. All these spiny processes upon the thoracic segments are much more marked than in *Eurycope novæ-zelandiæ*. The present species, however, in other respects, comes very near to *Eurycope atlantica*.

The abdominal shield has a characteristic form, which is well displayed in the figure of the species (Pl. IX. fig. 8); the shape of the caudal shield is the best mark of distinction between this species and its immediate allies.

In the present species the abdominal shield is divided into two regions, an anterior and a posterior, by a pair of lateral notches; in front of these the margin of the caudal shield is rounded, and there are a pair of lateral spiny processes some way behind the articulation of the abdominal shield with the thorax. Behind the lateral notches are two long lateral processes, and between them the posterior extremity of the abdominal shield is prolonged into a blunt process. The upper surface of the abdominal shield is divided by furrows into three convexities, two lateral which terminate at the lateral notches, and one median, which is more or less anchor-shaped; it includes the two postero-lateral processes; anteriorly it is continuous for some way across the abdominal shield, which portion forms the cross bar of the anchor; in this region is a single median spine.

The *antennules* (fig. 9) have the usual broad, powerful, basal joint, from the upper surface of which the rest of the appendage arises, at the end of the posterior two-thirds of its length; the second joint is short and somewhat square in shape, the third joint is as long, but narrower and cylindrical, the fourth joint is extremely short. The flagellum is extremely long, gradually narrowing towards its apex; the jointing of the flagellum does not commence at its extreme proximal end.

The *mandibles* are stout and strong, and divided at the extremity into several tooth-like projections; below the extremity is a tuft of fine hairs, and behind this the molar process, which is strong and bent downwards; it is triangular in form, with a smooth oblique cutting edge, on one side of which is a row of fine hairs. The palp (Pl. IX. figs. 10, 12) is four-jointed, the two distal joints are stout and curved.

The *maxillipedes* are displayed in fig. 11; they are closely similar to those of other species.

At Station 168 were dredged a number of small individuals which possibly belong to this species; I cannot be positive about this point as I did not take any actually from the ovigerous cavity of the female; they were obtained at the same haul of the dredge, with *Eurycope novæ-zelandiæ*, but still there may be some doubt whether they

are the young of this species; the uncertainty must be borne in mind in considering the following facts. These specimens are immature, as is shown by the non-development of the terminal segment of the thorax; the most remarkable peculiarity about them is the great length of the lateral prolongations of the caudal shield; these far exceed in length the same process of the adult *Eurycope novæ-zelandiæ*, and in fact resemble the present species and *Eurycope atlantica*, from the former of which these young examples show no very great differences. Fig. 2 of Pl. IX. illustrates the external characters of these young specimens. If they are really the young of *Eurycope novæ-zelandiæ*, the fact will be of interest as tending to show that this species has been derived from a species nearly identical with *Eurycope fragilis*. This will be some evidence in favour of regarding *Eurycope fragilis* as a (comparatively speaking) archaic form, and its very wide distribution, which will be referred to presently, is quite reconcilable with this view.

Station 147, off Marion Island, December 30, 1873; lat. 46° 16′ S., long. 48° 27′ E.; depth, 1600 fathoms; bottom temperature, 34°·2 F.; Diatom ooze.

Station 152, Southern Ocean, February 11, 1874; lat. 60° 52′ S., long. 80° 20′ E.; depth, 1260 fathoms; Diatom ooze.

Station 158, Southern Ocean, March 7, 1874; lat. 50° 1′ S., long. 123° 4′ E.; depth, 1800 fathoms; bottom temperature, 33°·5 F.; Globigerina ooze.

Station 237, off Yokohama, June 17, 1875; lat. 34° 37′ N., long. 140° 32′ E.; depth, 1875 fathoms; bottom temperature, 35°·3 F.; blue mud.

Eurycope atlantica, F. E. Beddard (Pl. IX. fig. 13).

Eurycope atlantica, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 919.

This species is represented by a single specimen, which was dredged in the North Atlantic, from a depth of 900 fathoms.

Eurycope atlantica is very similar to *Eurycope fragilis;* as, however, all the individuals of the latter species agree to differ from the present in a number of small though perfectly constant characters, the separation of the two forms appears to be necessary; the main points of difference are as follows:—

In *Eurycope atlantica* there are two spines on the head, placed on either side of the dorsal median line, and two curved spines, placed one behind the other, upon the caudal shield.

In *Eurycope fragilis* there are no spines upon the head, and only one spine upon the caudal shield, situated not upon the caudal shield itself, but just anterior to it in a region which I imagine to correspond to the anterior abdominal segment. Moreover, the shape of the caudal shield is distinctly different in the two species.

The example of *Eurycope atlantica* only measures 10 mm. in length; the body is rather narrower, but of fairly uniform width; it does not narrow greatly either at the anterior or at the posterior extremity.

The head is very long, equalling the two first segments of the thorax taken together in its antero-posterior diameter; on either side, about halfway between the anterior and posterior margin of the head, is a strong hooked spine; the frontal region of the head, between the attachments of the antennæ, is extremely narrow.

Of the first four segments of the thorax the first is rather shorter than the rest, which are subequal; the three last of these segments are furnished with a longish median spine, as in *Eurycope fragilis*.

The lateral margins of these segments, as in so many other species of the genus, are prolonged into a forwardly directed spine, which is in the present species extremely delicate and slender though not specially long; behind the spine are a number of inconspicuous denticulations, and in the fourth segment one of these latter is especially prolonged and equals the lateral spine in length; in this segment, therefore, there are two instead of only one lateral spine on either side.

The three posterior thoracic segments, as is usual in this genus, differ markedly in their character from the anterior segments of the thorax; they are wide and more convex, and V-shaped; the last of these segments has a straight posterior margin instead of a very concave one, but it includes possibly one at least of the anterior segments of the abdomen; the first two of these segments have each a pair of spines placed one on each side of the dorsal median line; in the third segment there are only faint indications of these spines; laterally each of these segments is prolonged into a flattened, forwardly directed spine.

The abdominal shield has a very peculiar form, which serves to distinguish the species from any other; it is somewhat oval in form and terminates behind in a somewhat obtusely pointed extremity; in front of the articulation of the uropoda are a pair of lateral spines, which are curved forwards in a crescentic shape; in front of these again, but some way behind the antero-lateral margin of the caudal shield, are another pair of lateral spines, straighter than the more posterior pair of spines. The upper surface of the caudal shield is divided into three areas by two longitudinal furrows; the central area is the widest and has a pair of median spines situated one behind the other; the first of these is placed close to the anterior boundary of the abdominal shield and corresponds to a similar spine in *Eurycope fragilis*, the second rather more than halfway down.

The first pair of *thoracic appendages*, like those of other *Eurycope*, are considerably smaller than those which follow.

The *uropoda* consist of a basal joint, which is stouter than the succeeding joint; I did not observe the uropoda to be biramose, but do not wish to speak with certainty on the point; they arise from just underneath the posterior lateral spines of the abdominal shield.

Station 76, off the Azores, July 3, 1873; lat. 38° 11′ N., long. 27° 9′ W.; depth, 900 fathoms; bottom temperature, 40° F.; Pteropod ooze.

Eurycope sp., F. E. Beddard.

Eurycope sp., F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 920.

At Station 147, in company with several specimens of *Eurycope sarsii* and one specimen of *Eurycope fragilis*, a fragment of a Munnopsid was dredged which I am inclined to refer to the species just described, viz., *Eurycope atlantica*. As, however, the specimen is so fragmentary, this identification might very easily be questioned, and I therefore describe the specimen by itself and without giving it a name.

The fragment measures 11 mm. in length, and consists of the last three segments of the thorax and about the first half of the caudal shield; two of the thoracic appendages belonging to this region of the body have been preserved; they are characteristically natatory, and like those of other species of the genus *Eurycope*.

The thoracic segments are shaped precisely like those of *Eurycope atlantica*, and like them are furnished with a pair of spines, one on either side of the dorsal median line; the spines of the last segments are quite as conspicuous as those of the first two.

The boundary line between the last segment of the thorax and the abdominal shield is not perhaps quite so distinct as in *Eurycope atlantica;* the abdominal shield has at least three spines, placed medially one behind the other on the dorsal margin; two of these appear to belong to two free segments of the abdomen, which in this species, as in others, are half enclosed by the last segment of the thorax; one is upon the abdominal shield proper.

Station 147, off Marion Island, December 30, 1873; lat. 46° 16′ S., long. 48° 27′ E.; depth, 1600 fathoms; bottom temperature, 34°·2 F.; Diatom ooze.

Eurycope spinosa, F. E. Beddard (Pl. X. figs. 6, 7).

Eurycope spinosa, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 921.

One of the most remarkable Munnopsids obtained by the Challenger is the present species. It is unfortunately only a mutilated fragment, but sufficient remains to show that it is a member of the family Munnopsidæ, and is the type of a new species of that family, probably referable to the genus *Eurycope*.

It was dredged from 1950 fathoms of water in the neighbourhood of the antarctic ice barrier.

The specimen is a fragment of an immature female, consisting of the head and the first four segments of the thorax; it measures 10 mm. in length.

The most noticeable feature about this species is that it is covered with numerous long and slender spines, an entirely new character in the organisation of the Munnopsidæ.

Apart from the presence of these spines, however, the specimen does not present any great differences from other species of the genera composing the family, as will be apparent from the following description.

The head and the segments of the thorax appear to be subequal in size.

Each of the four segments of the thorax is furnished with a long slender spine in the median dorsal line, situated close to the anterior of the segment; on the head this median spine is absent, but there are a pair of lateral spines situated a little way behind the articulation of the antennæ; these are absent from the first segment of the thorax but present on the other three, and are of equal length with the median spine.

On the epimera are two or three long spines; I am unable to describe them more accurately, as they were broken off in so many instances that it is quite impossible to write with any certainty; the description that I am able to give is as follows:—

On the fourth thoracic segment, on the right side, are three long spines, one dorsal and between the other two; on the three anterior segments were apparently only two such spines, one below the other; on the left side of the body most of the corresponding spines were broken off; they all appear to be placed on the epimera.

The ventral side of the body was comparatively smooth, each of the segments, however, appeared to possess a minute median spine, which was certainly present in the third and fourth segments; these spines are extremely small, and nothing to compare to those on the dorsal surface, which equalled or even exceeded in length the diameter of the body of the creature.

The only pair of appendages apart from the mouth organs which have been preserved are the thoracic limbs of the first pair. These are delicate and slender, much more so than the succeeding limbs, judging from the fragments of them which remain. The first joint is the longest, the second shorter, and the third very short indeed; the fourth joint is slender and somewhat curved, nearly as long as the first joint, the fifth is rather shorter; this appendage has not the characters of a prehensile hand to anything like the extent that it has in *Munnopsis latifrons*.

I include the specimen within the genus *Eurycope*, without wishing to pledge myself in any way to the accuracy of this determination. It is evident from the foregoing description that there are not sufficient data to assign it to any particular genus. The general aspect of the fragment, however, apart of course from the long spines which deck the body, is very like *Eurycope sarsii* and other species of the genus *Eurycope* described in the present Report.

Station 157, Southern Ocean, March 3, 1874; lat. 53° 55′ S., long. 108° 35′ E.; depth, 1950 fathoms; bottom temperature, 32°·1 F.; Diatom ooze.

Eurycope intermedia, F. E. Beddard (Pl. X. fig. 5).

Eurycope intermedia, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 919.

This is a small species, only measuring 9 mm. in length.

The description which follows is based upon a single individual, dredged from the great depth of 2740 fathoms, in the North Pacific.

This species is closely allied to *Eurycope sarsii*, *Eurycope fragilis*, *Eurycope novæ-zelandiæ* and *Eurycope atlantica*, but may be readily distinguished from all these by the shape of the caudal shield, which is rounded behind and has no median spiny process, but a pair of lateral processes just above the articulation of the uropoda. A comparison of Pl. XI. fig. 1; Pl. IX. fig. 8; Pl. IX. fig. 1; Pl. IX. fig. 13; Pl. X. fig. 5, will at once make this difference apparent.

In other respects *Eurycope intermedia* is not unlike any of the four above mentioned species.

Eurycope intermedia is perhaps rather more cylindrical in shape than its immediate allies; the body is widest at the fourth thoracic segment, but does not diminish much in width in front of and behind this segment as in so many other species.

The surface of the head is convex and is strongly marked by the attachments of the muscles.

The four succeeding segments of the thorax are subequal in length; the median portion of each is depressed, the anterior and posterior margin of the segment being raised, the lateral portion of each segment is, however, convex. In the dorsal median line of each segment is a short spine pointing forwards; in this character, therefore, *Eurycope intermedia* differs from its allies; in *Eurycope sarsii* there are no such spines, while in the other three species referred to above it is only the second, third, and fourth segments which have spines. The spines are of approximately equal length on all the segments. The antero-lateral margins of these segments are furnished with spines, with the possible exception of the fourth, where they are, at any rate, very minute.

The epimera of these segments are short, and their free margin is prolonged anteriorly into a slender spine, which is directed forwards; the epimeral spine of the fourth segment is, if anything, rather longer than that of the preceding segments, but the spines are well marked and distinct in all the segments.

The three posterior segments agree very closely in their general form with the corresponding segments of the other allied species; the last of these segments is, however, rather longer than either of the preceding ones.

Each of the segments, as in *Eurycope fragilis*, is furnished with a single pair of short spines, one on either side of the median line; the pair of spines is placed nearer to the anterior than to the posterior margin of the segment. The last thoracic segment has a straighter posterior border than either of the two preceding, which are very markedly convex in front and concave behind.

Between the posterior border of the last thoracic segment and the anterior border of the abdominal shield is a convex area, marked by a transverse furrow, which corresponds (?) to the terga of certain of the anterior abdominal segments.

The shape of the abdominal shield, as already mentioned, serves to distinguish this species at a glance from any of its allies; as in *Eurycope fragilis*, the caudal shield is

notched on either side at the commencement of the posterior third; just beyond the notch is a slight transverse process, which covers over the articulation of the uropoda; these lateral processes are, however, much less distinct than in *Eurycope fragilis;* the termination of the caudal shield is not a blunt spiny process as in that species, but is smooth and rounded off, and there is no spine upon the dorsal surface. The caudal shield is divided by two furrows into a median T-shaped and two lateral convex areas, which are distinctly separated from each other.

The terminal area of the caudal shield is not bent downwards as it is in *Eurycope sarsii*, and more particularly in *Eurycope pellucida.*

The *thoracic limbs* appear to resemble those of *Eurycope novæ-zelandiæ.*

The *uropoda* are biramose, with a more slender exopodite than endopodite; their length is considerable, they are, both actually and relatively, longer than those of *Eurycope sarsii.*

I am bound to say that it is not unlikely that this species, as well as *Eurycope fragilis* and *Eurycope atlantica*, may prove to be but variations of one species. In the meantime, however, I prefer to regard them as distinct, since in a considerable number of specimens of *Eurycope fragilis* from different localities, I have not observed any differences so great as those which separate these supposed species.

Station 252, off the Sandwich Islands, July 12, 1875; lat. 37° 52′ N., long. 160° 17′ W.; depth, 2740 fathoms; bottom temperature, 35°·3 F.; red clay.

Eurycope pellucida, F. E. Beddard (Pl. XIV. figs. 1, 2).

Eurycope pellucida, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 920.

The present species is the largest known. A single specimen only, from Station 218 (1070 fathoms), was obtained by the Challenger, and measures 45 mm. in extreme length by 10 to 12 mm. in breadth.

The large size of the species is not, however, its only peculiarity. It is remarkable for the fact that the integument is almost transparent, and appears to contain but little calcareous matter; the specimen is naturally very soft, and its texture and general appearance is very like that of oiled tissue paper; it is of course difficult to give an idea of this in a figure.

The extreme delicacy of the specimen has unfortunately brought about the loss of the antennæ and of all the thoracic limbs; I find on reference to some MS. notes by the late Dr. v. Willemoes-Suhm, that the specimen, even when first obtained, was broken in this way.

The thinness and transparency of the integument is rendered more striking by the feeble development of the musculature.

In other respects the species is not remarkable, and finds its nearest ally in *Eurycope sarsii.*

The head is rounded and convex dorsally; the insertions of the antennæ and antennules are so close together that there is only a very narrow interval of communication between the frontal region of the head and the posterior region; this is also characteristic of *Eurycope sarsii* and other species.

The frontal margin is slightly convex, the lateral region of the head is quadrangular in shape, and is prolonged downwards and forwards for some way below the attachment of the thoracic limbs.

The first segment of the thorax is very short (antero-posteriorly), and not wider than the head; its anterior margin is formed of two concave areas, and the median triangular process resulting from the union of these fits into a corresponding cavity in the posterior margin of the head; laterally the segment lies completely parallel to the lateral region of the head, and is slightly overlapped in the way shown in the figure (Pl. XIV. fig. 1) by the second segment of the thorax; its appendage is attached at a point considerably below the level of the succeeding appendages of the thorax.

The second and third segments of the thorax are subequal and slightly longer than the first segment; each is ridged anteriorly and posteriorly, the central area of the segment being depressed and saddle-shaped; laterally each of the segments is occupied by an oval convexity, which is larger in the third than in the second segment. The second segment has a concave anterior and a convex posterior margin, the lines being almost straight in the middle of the segment. The third segment is concave anteriorly, but its posterior margin is concave in the middle and convex laterally.

The fourth segment of the thorax is as long as the second and third taken together, it is on the whole similar to those, but the lateral convex areas are larger. The curvature of the anterior and posterior margins are parallel to each other and to the posterior boundary of the segment in front.

All these segments are furnished with short epimera.

The width of the body is greatest at the fourth segment.

The length of the first four segments of the thorax taken together is 5 mm.; the three posterior segments of the thorax measure together 18 mm.

The fifth segment of the thorax is V-shaped, but not so strikingly so as in many allied species, among others *Munnopsis sarsii;* the concave posterior boundary of the segment is much less deeply curved than the anterior convexity; the upper surface of the segment is very convex and is traversed by a longitudinal median furrow which divides it into two areas.

The sixth segment is of approximately the same shape and size as the preceding one.

The seventh segment is distinctly shorter; its anterior and posterior margins are parallel with each other and almost straight.

The epimera of these segments are very short and inconspicuous.

As may be seen in the figure (Pl. XIV. fig. 1) the limbs belonging to these segments

are not given off at corresponding points. The anterior pairs are placed considerably more dorsally than are either of the two hinder pairs.

The abdominal shield is separated from the last segment of the thorax by what appears to be two free abdominal segments. It should have been mentioned that the three posterior thoracic segments are separated from each other by a thickened rim which is conspicuous in the actual specimen by its white opaque colour.

The abdominal shield is ridged along its anterior margin, and the interval which separates it from the posterior ridge of the last segment of the thorax is itself divided into two equal areas by a median ridge-like thickening; this appears to be the boundary between the free abdominal segments; they are extremely narrow, their relative proportion being shown in the figure.

It is impossible to describe with accuracy the shape of the abdominal shield, as it is so soft and impressionable; the accompanying figure, however, is approximately correct; the termination of the abdominal shield is, as it were, bent underneath the body, so that the anus comes to look almost forwards instead of downwards or backwards. The intestine does not run straight to the anus but follows the convex outline of the caudal shield, passing round by its greater curvature.

It was very easy to ascertain the course of the alimentary canal without any dissection; the muscles of the species are so slightly developed that the body cavity appears to be entirely empty save for the presence of the gut, which was conspicuous through being full of dark-coloured food.

The anus is guarded by large flap-valves indicated in fig. 1 of Pl. XIV.

The appendages are only represented by the gnathopods and the abdominal limbs, and by traces of the other appendages.

One *antennule* is nearly perfect; it consists of a stout basal joint giving off a strong pointed process on the outer side, with this are articulated two other smaller cylindrical joints, the third very considerably longer than the second; the flagellum is broken off at the tip and is evidently of some length; the proximal region of the flagellum is not ringed; distally the flagellum is constricted into rings which are (fig. 5) extremely short.

The *antennæ* are only represented by four short basal joints.

Both the antennæ and the antennules of the specimen are directed more upwards than is usually the case; this is shown in the lateral view of the entire Crustacean (fig. 1). The insertion of the antennæ is also rather in front of that of the antennules.

The *mandibles* are stout and powerful and have no trace of a palp.

In the *first pair maxillæ* the upper lobe has the usual form and is provided along its anterior edge with numerous firm, yellowish spines, among which are abundant fine hairs; the lower lobe is densely beset with hairs but has no spines; its extremity is rather pointed.

The *second pair of maxillæ* is very closely similar to the same pair of appendages in *Eurycope sarsii*.

The palp of both *maxillipedes* was entirely wanting in the specimen; but I have little doubt that fig. 2, copied from a drawing left by the late Dr. v. Willemoes-Suhm, represents the maxillipede palp.[1]

The lamina of the maxillipede is somewhat curved at its tip, it is a thin delicate plate. The stipes of the maxillipede has the distal joint furnished with a single row of the peculiar sense organs found in this situation in most Isopoda along the inner margin, these commence at the base of the joint and are continued up nearly to its summit; the distal extremity of the joint is truncate and bears a row of long yellow spines like those of the maxilla, and interspersed among them a number of fine hairs; a projecting portion of the joint, at the inner side, bears three enormously thick knife-shaped spines, behind which is a tuft of slender hairs.

Of the thoracic appendages only stumps are left as indicated in the figure (fig. 1); the first four appendages gradually increase in size, the first being the most slender and the fourth the stoutest. The fifth and sixth pairs of limbs have their basal joints of about equal thickness to those of the fourth pair. The last pair of ambulatory limbs are again more slender.

Reference has already been made to the mode of attachment of these limbs.

The first pair of abdominal limbs are fused to form a tongue-shaped appendage, which covers over the gills. A central ridge marks the union of the two halves as well as the free extremity, which is bifid; the two ends being curved away from each.

The *uropoda* are not present in the specimen and I am inclined to fancy that they may be altogether aborted in this species; there was, at any rate, no trace of any place of articulation.

Station 218, off New Guinea, March 1, 1875; lat. 2° 33′ S., long. 144° 4′ E.; depth, 1070 fathoms; bottom temperature, 36°·4 F.; blue mud.

Eurycope abyssicola, F. E. Beddard (Pl. XIV. figs. 5–8).

Eurycope abyssicola, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 921.

The present species is not unlike *Eurycope pellucida;* it has the same remarkable transparency of body, but its chitinous integument is even less resistent than that of the species last described. The specimen has consequently collapsed altogether, and the figure which illustrates it is copied from a drawing by v. Willemoes-Suhm, which doubtless represents the Crustacean more accurately than any sketch which could now be made. Although the general outline and shape of the individual cannot be properly made out from the alcohol specimen, the appendages are better preserved than those of *Eurycope pellucida;* in addition to the mouth and abdominal appendages, the first

[1] A fragment of an appendage corresponding to this drawing is mounted on a slide and labelled "Munnopsid, 1070 fathoms;" it has doubtless been removed from the present specimen.

ambulatory limb and one of the posterior thoracic limbs have been fortunately preserved, and one of the antennules is perfect.

Eurycope abyssicola appears to be a distinct species from *Eurycope pellucida*, but, owing to its damaged condition, it is difficult to speak with certainty.

There was only one specimen obtained in the North Atlantic, from a depth of 2175 fathoms.

It measures 40 mm. in length.

The head is convex and has the same general form as in the last species.

The first four segments of the thorax are narrow and together measure no more than the fifth segment of the thorax alone; the first four segments increase progressively in length from before backwards.

Of the three posterior segments of the thorax the middle one appears to be rather the largest, while the first and third are subequal.

The abdominal shield is so damaged that it is quite impossible to give any idea of its size or shape.

In the figure of the species (Pl. XIV. fig. 5), the abdominal shield is indicated as in v. Willemoes-Suhm's drawing; he, however, marks it with a dotted line, in order to imply that the real form is doubtful; from an examination of the specimen it appears to me to be more likely that the abdominal shield resembles that of *Munnopsis pellucida*; I have refrained, however, from perpetuating a possible error by a hypothetical figure, and so leave it in the original condition. It will be seen that v. Willemoes-Suhm's drawing departs in one or two other particulars from the very brief description that I have been able to give of this species, but I have preferred to let his drawing stand, as it is undoubtedly more likely to be true than a sketch of my own after the specimen has been kept for so many years.

The *antennule* has a comparatively long flagellum, which would reach back as far as the commencement of the sixth thoracic appendage. The shape of the appendage, at any rate as regards the peduncle, is slightly different from that of the last species the end joint arises from the tip of the first joint instead of from its inner surface; the second joint is also of a different shape, and the third joint is longer than in the last species.

In fig. 8 is represented a structure which perhaps is the end of one of the antennæ, found on the trawl with the specimen. I quote this MS. statement of v. Willemoes-Suhm without any comment.

The *mandibles* have no palp, as in the last species.

The first four thoracic limbs are comparatively slender, the first of these is represented in fig. 7.

The next two thoracic appendages belonging to segments five and six are considerably stouter; of these one of the second pair has been preserved (fig. 6); it has an

enormous foliaceous fifth joint fringed with hairs; the terminal joints of the appendage are evidently lost.

Of the abdominal appendages I could not detect any trace.

Station 68, off the Azores, June 24, 1873; lat. 38° 3′ N., long. 39° 19′ W.; depth, 2175 fathoms; bottom temperature, 36°·2 F.; Globigerina ooze.

Ilyarachna, G. O. Sars.

Mesostenus, G. O. Sars, Om en anormal Gruppe af Isopoden, Forhandl. Vidensk. Selsk., 1863, p. 211.
Ilyarachna, G. O. Sars, Christ. Fjord. Dybvands-Fauna, 1869, p. 44.

A number of very small Munnopsids dredged near Christmas Harbour, Kerguelen, in 120 fathoms, evidently belong to Sars's genus *Ilyarachna*, and are the sole representatives of that genus which were obtained during the voyage of the Challenger; these specimens also happen to be the only Munnopsids that were dredged in shallow water, and like the shallow-water forms of the northern hemisphere are of small size.

The definition of the genus given by Sars is as follows:—

Body hardly depressed, subpyriform from above, pointed posteriorly. Anterior region of body separated from posterior by a deep constriction, everywhere of approximately the same breadth. Head large and broad, truncated in front, with no rostrum; four anterior thoracic segments short, excavated above, with lateral processes directed forwards; three following segments large, convex above, without lateral processes; the last but one hardly narrower than anterior segments, deeply emarginate behind. Abdominal segment narrow, triangular, with a pointed extremity. Upper antennæ short, with a few-jointed flagellum. Mandibles short and stout, not divided at extremity, furnished with an obliquely transverse crest, a narrow molar process with a few setiform spines, palp absent, or small and three-jointed. First pair of legs as in *Eurycope;* second pair differing from the rest, stouter; two following pairs subequal, and often very elongate. Of the posterior thoracic limbs the first two pairs as in *Eurycope;* last pair long and narrow, with scarcely dilated joints and a long curved terminal claw. Abdominal operculum large, nearly completely covering the abdomen with a median crest and numerous marginal setæ. Caudal appendages simple, two-jointed; basal joint large and laminar, with plumose hairs along the margins.

Ilyarachna quadrispinosa, n. sp. (Pl. XII. figs. 2–6).

Several examples of this species were dredged in shallow water (120 fathoms) off Christmas Harbour, Kerguelen; it is a very small species, the largest individual—a female with eggs—only measuring 6 mm. in length.

The head is of the same breadth as the following segments; its antero-posterior diameter is greater laterally than in the middle line; the surface of the head is convex,

and there are a pair of short spines, one on either side of the median line, and situated exactly behind the articulation of the antennules.

The first four segments of the thorax are subequal in length; they increase in width up to the third; the length of the anterior region of the body comprising the head and the first four segments of the thorax is about equal to that of the posterior region. Each of the first four thoracic segments is concave above, the anterior and posterior margins being raised into a ridge; the anterior ridge in all these segments is prolonged into a number of short spines, which have a more or less regular arrangement as follows: there are four principal spines of equal length, which are disposed symmetrically and at equal distances from each other and from the median dorsal line; in the fourth segment of the thorax the spines are less marked owing to the fact that they are placed a little way back from the anterior margin of the segment; they also appear to be more numerous than in the preceding segments; the lateral margins of the segments as well as of their epimera are also spiny.

The three posterior segments of the thorax increase progressively in length,[1] and have the characteristic form of the genus; the first of the segments has a few spines along its anterior margin, but they are wanting on the subsequent segments.

The abdominal shield is triangular in form, the median region is much more convex than the lateral regions, from which it is separated by furrows.

The *antennules* (fig. 3) are very short, not more than one-fifth of the length of the body; they almost touch each other at their insertion on the front margin of the head; the basal joint of the peduncle, as is usual in the Munnopsidæ, is of very great length and breadth compared to the small second joint, which is at the same time the last joint of the peduncle. The flagellum has seven or eight joints, of which the first is extremely long.

The *antennæ* were in every specimen broken off at the fourth joint; the three basal joints are as usual short and stout.

The *mandibles* appear to be without a palp.

In the thoracic limbs the fifth and sixth pairs have the antepenultimate joint extremely broad and flattened; the penultimate joint on the contrary (fig. 6) is extremely narrow and not wider than in the anterior thoracic appendages, which are not modified into natatory limbs; it is, however, like the preceding joint, fringed with long plumose hairs; the second joint of these two limbs has a long spine on the outer side.

The last pair of thoracic appendages are not characteristically natatory limbs; the antepenultimate joint, although to some extent flattened and therefore fitted for swimming, is not nearly so much expanded and flattened as in the case of the fifth and sixth pairs of appendages; this is the principal generic character of *Ilyarachna*, and for this reason I have assigned the present species to that genus.

[1] In the smaller specimens the last segment of the thorax is distinctly smaller than the preceding, doubtless owing to the difference in age of the specimens.

The *uropoda* are extremely small and closely attached to the sides of the abdomina shield near to the posterior termination of the latter. They are figured in position in fig. 4, and one of the appendages, more highly magnified, is shown in fig. 5 of the same plate;[1] the protopodite is of considerable length and bears two rami of which the more distant is the larger, the latter being perhaps only doubtfully the equivalent of the other rami, in which case, the appendages of this species evidently agree very closely with those of other species, since they conform to the generic definition given above.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; lat. 48° 45′ S., long 69° 14′ E.; depth, 127 fathoms; volcanic mud.

Acanthocope, F. E. Beddard.

Acanthocope, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 922.

Two remarkable Munnopsids, both dredged in deep water in the southern hemisphere, and the types of two distinct species, appear to me to necessitate the creation of a new genus, which may be defined as follows:—

Generic Characters.—General form of the body oval, no marked difference in breadth between the anterior and posterior regions of the thorax. Anterior segments of the thorax increase progressively in length; the posterior segments of the thorax subequal; the general aspect of the thoracic segments as in *Eurycope;* epimera of all the thoracic segments from the second onwards, enormously elongated into curved sickle-shaped spines. The abdominal shield oval, with a long terminal spine as long as or longer than the caudal shield itself, and with two pairs of lateral spines, one more anterior, the second overlying the articulation of the uropoda. Antennæ with the two basal joints furnished with one or two long spines; mandibles divided into several tooth-like processes; molar process stout and powerful, with a blunt edge suitable for crushing, palp small and three-jointed. First pair or first two pairs of legs shorter and more slender than the rest, the two or three following pairs subequal and not greatly elongated. Posterior thoracic appendages natatory, with flattened penultimate and antepenultimate joints, fringed with long plumose setæ. Uropoda long and styliform, three or five-jointed.

Remarks.—The above generic definition necessarily applies to both the species which I include within the genus, but the characters of the two species are, in many respects, very unlike; on the whole *Acanthocope acutispina* comes nearer to the other genera of the family than does *Acanthocope spinicauda.* If it were necessary to assign the former species to any one of the genera already described, it would probably be referred to *Desmosoma.*

One of the most striking characteristics of the genus *Desmosoma*, viz., the shortness of the antennæ, I am unable to verify in the present genus, since in both species the

[1] The drawing has been accidentally reversed; the point of articulation of the appendage is directed towards the lower margin of the plate.

larger portion of these appendages are lost; the general form of the body, apart from the long spiny epimera, appears to be that of *Desmosoma*, while the characters of the thoracic limbs are peculiar to the genus. The characters of *Acanthocope spinicauda* are decidedly more aberrant (that is, compared to other genera) than those of *Acanthocope acutispina*; the great length of the telson and the five-jointed uropoda are perhaps the most remarkable structural features. The anterior thoracic limbs of this species agree much more closely with Sars's description of *Desmosoma*, the first pair being decidedly smaller than the rest, which are subequal; on the other hand, the immense disproportion between the anterior and posterior regions of the thorax is only comparable to a large species, which I have described above (p. 71), under the name of *Eurycope pellucida*, though I have pointed out that the generic identification of that species with *Eurycope* is by no means certain. The distribution of spines on the dorsal surface of the body in *Acanthocope spinicauda* is identical with that of *Eurycope fragilis* and the shape of the caudal shield is, apart from the immensely elongated telson, not very different. The styliform character of the uropoda, not to mention their being composed of six separate joints, prevents me from regarding this species as a *Eurycope*. Although in *Acanthocope spinicauda* the posterior appendages of the thorax have quite the typical form that they have in *Eurycope*, *Desmosoma*, &c., both species of this genus show a certain approach to the Asellidæ in the fact that the penultimate joint is not nearly so fitted for swimming as in those genera, being much narrower; in this respect all the three posterior thoracic appendages are like the terminal pair in the genus *Ilyarachna* (see p. 77). There can be but little doubt that these two species belong to a distinct genus from those already known, but the question is whether they are sufficiently alike to be included in the same genus; for the present I am inclined to unite them on account of the general similarity in outward form.

Acanthocope spinicauda, F. E. Beddard (Pl. VIII. figs. 6–12).

Acanthocope spinicauda, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 922.

This species can be distinguished at once from any other Munnopsid by the extremely long, slender telson, which is about half as long as the remaining portion of the body. It presents other remarkable characters, and is one of the most curious forms of Munnopsidæ obtained during the voyage. A single specimen only was dredged between Kerguelen and Australia in 1800 fathoms, at the same station as produced the remarkable *Ischnosoma bacillus*. The specimen has been stained in picrocarmine and mounted in Canada balsam. The specimen has been somewhat crushed in preparation; the figure, therefore (Pl. VIII. fig. 6), cannot be so accurate as might be wished.

The specimen is a male, measuring 8 mm., inclusive of the long spiniform telson.

As a rule this family of Isopods is not remarkable for the presence of pigment. Many

species, such as *Eurycope pellucida*, are glassy and transparent, or semitransparent, and have no pigment whatever, while those which are coloured, such as *Eurycope sarsii*, appear to owe their coloration, which is diffused and even, to the subjacent muscles. In the present species, which appears to have been nearly transparent during life, there is no pigment recognizable anywhere in the integument, but there are two longitudinal masses of pigment commencing near the head and running down along the back to a little way in front of the caudal shield; careful focussing with a high power made it apparent that there are really four bands of pigment, two dorsal being superposed upon two ventral bands; the extension of these pigmented areas would correspond exactly with that of the hepatic cæca, and in any case the pigment was situated well below the integument, as could be determined by careful focussing; the individual pigment spots were situated at regular distances from each other, and had entirely the appearance of being contained in the interior of uniformly-sized cells.

The pigmented bands were wider in the head, and gradually tapered off towards their posterior extremities; the presence of the pigment spots naturally marked out the limits of the tissue containing them; there appears to me to be but very little doubt that the pigmented areas are in fact the hepatic cæca. I can see no reasons against this view, and in favour of it are (1) the presence of the pigment below the integument; (2) its disposition in four longitudinal bands; (3) the shape of these bands which are wider anteriorly, and taper posteriorly; and (4) the extension of the bands which commence in the head just behind the masticatory stomach and reach to near the tail.

The head is large and squarish in outline; the frontal margin is straight, and there is a wide interval between the insertion of the antennary appendages of either side, as in *Munnopsis latifrons*, &c.

The first segment of the thorax is much the shortest, and is not prolonged laterally the second and third segments are subequal, and have about three times the diameter (antero-posterior) of the first; the fourth segment is about half as wide again as either of the preceding segments.

Each of these segments has a pair of long, curved, spiniform epimera, which are directed outwards and somewhat forwards; the epimera of the second thoracic are rather longer than those of either of the two succeeding segments, in every case they are fringed with short spines.

In the dorsal median line each of the four anterior thoracic segments has a long upwardly and forwardly directed spine, which arises near to the anterior margin of the segment.

The three posterior segments of the thorax are about equal in length; this region of the thorax is about twice the length of that occupied by the first four segments; the lateral diameter of the fifth segment is greater than that of the two following segments, which decrease progressively.

These segments have the same general form as in *Eurycope sarsii*, &c., but are

furnished with long spiniform epimera, which, like those of the preceding segment of the thorax, are curved forwards, with the exception of the last segment, where they are directed backwards; the epimera, instead of arising above and to the outside of the limbs, as in the second, third, and fourth segments, arise in front of the attachments of the latter. Each of the three posterior segments of the thorax (with the possible exception of the first) has a pair of long spines, one on either side of the dorsal median line, arising on the anterior region of the segment, the sixth segment had on one side of the body a ventral spine arising below the attachment of the limb and exactly underlying the epimeral spine; these are probably present in the other segments, but I did not succeed in seeing them.

The abdominal shield is oval, and terminates in the long spiniform telson.

At the commencement of the abdominal shield is a long, single, median spine on the dorsal surface; a single pair of lateral spines are placed about halfway between the commencement of the shield and the attachment of the uropoda; just in front of the latter are another pair of spines longer than the anterior pair, and like them directed somewhat backwards as well as outwards. Below these and arising just behind the anus are another pair of shorter spines, not more than one half the length of the former; the uropoda are attached exactly between the two spines of each side. These relations are shown in fig. 11.

The *antennules* (Pl. VIII. figs. 6, 7) are comparatively long, nearly as long as the body minus the telson, and are furnished with a very long multiarticulate flagellum, many times the length of the peduncle.

Of the *antennæ* (fig. 8) only the three basal joints have been preserved, these are short and subequal in length; each of the first two is prolonged into a stout spine on either side of its articulation with the succeeding joint; the inner spine is in each case rather longer than the outer spine.

The *mandibles* are complicated and consist of two distinct portions besides the palp.

It must be remembered, however, that the interpretations here given may very possibly be erroneous, as it is naturally rather difficult to study the mouth appendages satisfactorily *in situ*.

On comparing the figure of the mandible of this species with that of *Eurycope sarsii*, it is seen to consist of the same parts, but the masticatory process, which almost exactly resembles in shape the mandible of *Serolis*,[1] is much stouter.

The upper half of the mandible is markedly asymmetrical; the left hand mandible has several teeth-like processes which are wanting in the mandibles of the right side.

The remaining appendages of the mouth do not appear to be in any way remarkable.

The thoracic limbs are, as in the genera *Munnopsis* and *Eurycope*, specialised into an anterior and a posterior series.

[1] *Op. cit.*, Zool. Chall. Exp., part xxxiii. pl. iii. fig. 9.

The former are long clawed ambulatory limbs, which do not present any great discrepancies of size in this species; all four pairs are of approximately the same length and thickness; the structure of these limbs is so like that of other species that I need not particularly describe them.

The last three appendages of the thorax (figs. 9, 10) are swimming legs; the last joint but one of each appendage, and the joint in front of that again, are flattened out and fringed with hairs; the terminal joints of these limbs are narrow and claw-like, so that they possibly subserve the double function of swimming and walking, especially since the penultimate, and to a less extent the antepenultimate, joints are not very wide; not nearly so wide as they are, for instance, in *Eurycope* (see Pl. IX. fig. 5); all the three pairs of appendages are, in fact, closely similar to the last pair of thoracic appendages in the genus *Ilyarachna* (see p. 77).

The *uropoda* (fig. 11) are of extraordinary length, quite as long if not longer than the terminal spine of the abdomen; the appendages are simple and composed of at least five joints, more or less equal in length, and beset with a few scattered hairs.

Station 158, Southern Ocean, March 7, 1874; lat. 50° 1′ S., long. 123° 4′ E.; depth, 1800 fathoms; bottom temperature, 33°·5 F.; Globigerina ooze.

Acanthocope acutispina, F. E. Beddard (Pl. VIII. figs. 1–5).

Acanthocope acutispina, F. E. Beddard, Proc. Zool. Soc. Lond., 1885, pt. iv. p. 923.

This species, which was dredged at Station 302 in 1450 fathoms, is very closely allied to the last, but differs from it in a number of characters sufficient to necessitate its separation as a distinct species. The single specimen is mounted on a slide in glycerine; it is of a uniform dark brown colour.

The extreme length of the specimen is 5 mm.

The head is rounded with an abruptly truncated frontal margin.

The first segment of the thorax is much shorter and narrower than any of the succeeding segments; its lateral margins are rounded and not prolonged into spiny processes. The three following segments gradually increase in width as well as length up to the fourth where the body is widest; their lateral margins are prolonged into very long spiny processes which are slightly curved, the direction of the curvature being anterior. The three posterior segments of the thorax are together rather less in length than the first four segments; there is no great break between the anterior and posterior sections of the body, the general outline being, therefore, as in *Eurycope*, oval; each of the three posterior segments is, as usual, convex forwards and concave backwards, the antero-posterior diameter of these segments is subequal. Like the anterior segments of the thorax they are furnished with long lateral spines curved in a forward direction, though the longitudinal axis of the spine gets to be placed more and more obliquely backwards

with respect to the longitudinal axis of the body in the successive segments. The length of the thoracic spines is very considerable; anteriorly and posteriorly they are nearly equal in length to the diameter of the body; in the middle segments they are about equal in length to half the diameter of the body.

These epimeral spines are furnished with four rows, equidistant from each other, of short transversely arranged spines (see fig. 4); proximally these spines are set at right angles to the longitudinal axis of the epimeron, distally they are inclined to it at a less angle; the whole surface of the body is covered with similar spines, which are also found upon the head.

The abdominal shield is oval in outline, it is prolonged behind into a long telson spine which is about equal in length to the shield itself; there are two pairs of lateral spines which are about equal in length to the telson spine; the first pair of these is directed backwards, though its curvature, as in the thoracic epimeral spines, is rather forwards; the last pair is not only directed backwards, but the curvature is backwards. The abdominal shield as well as its lateral and posterior spines are densely covered with short spines like the thorax.

The posterior pair of spines overlies the articulation of the uropoda; another spiny process, not quite so long as the first, springs from behind the articulation of these appendages; it corresponds almost exactly in direction to the dorsal spine.

The *antennules* (Pl. VIII. fig. 5) are very different indeed from those of the last species, but I am unable to give a very accurate representation of them owing to the fact that part of the peduncle is hidden in the specimen. The drawing of these appendages cannot, however, be very far wrong; the only fact that I cannot state for certain is the presence of the fourth joint in the peduncle, and judging from the analogy of the Asellidæ and other Munnopsidæ, it is in all probability present. The basal joint of the peduncle is very large, as is characteristic of the family; the remaining joints are small, the flagellum is extremely short in comparison with that of the last species, and only consists of four somewhat elongated joints.

Of the *antennæ* I have not thought it worth while to give a separate drawing, as they appear to agree so closely with those of the last species, the basal joints of which are shown in fig. 8 of Pl. VIII.; the spines upon the basal joints may perhaps be a trifle longer in proportion; both antennæ are incomplete, like those of *Acanthocope spinicauda*, and have been broken off at the same point.

The *mouth appendages* are obscured, owing to the method of preparation of the specimen, so that I am unable to give any description of them.

The two first pairs of *thoracic appendages* are subequal in length, they are shorter as well as more slender than the succeeding appendages, which are not, however, remarkable for their length, and are nothing like so elongated as are the same appendages in *Munnopsis typica*.

The *three posterior thoracic appendages* are modified in the swimming feet; the basal joint is comparatively long and stout; the two succeeding joints decrease progressively in length; the next joint is long, flattened, and crescent-shaped, the outer margin being thickened; it is fringed on both sides with long plumose hairs; the fifth joint is rather narrower, and apparently not so much compressed and flattened; it is fringed only on the inner side with similar plumose hairs; the distal joint is long and narrow; it terminates in a few longish hairs, and its outer side is closely fringed with very short hairs. The same remarks about the similarity of these appendages to the last thoracic limbs of *Ilyarachna* may be made on this species as on the last.

The *uropoda* (fig. 3) are long and styliform, reaching nearly to the extremity of the telson spine; they appear to be composed of three separate joints, the first and third being subequal and longer than the middle one.

It is evident from the foregoing description that this species presents many points of difference from *Acanthocope spinicauda*; since, however, both species are only represented by a single individual, which happen to be of opposite sexes, it is impossible to say with certainty whether some of the points of difference may not be sexual rather than specific; in the mean time, however, there is no other *Munnopsis* known in which the two sexes differ in so many points and in such points, though the fact that the present species are representatives of a new genus must be borne in mind in considering the question.

Regarding the two individuals as representing two distinct species, the points of difference are shortly as follows.

In *Acanthocope spinicauda* the three posterior thoracic segments taken together are about twice the length of the four anterior.

In *Acanthocope acutispina* the three posterior thoracic segments are shorter than the four anterior. The latter species also differs from the former in the absence of any long tergal plume and in the much greater length of the epimeral spines.

The two species also appear to differ in the relative development of the short spines which beset the general body surface; in *Acanthocope spinicauda* these spines are certainly visible on some of the epimeral spines, but they seem to be confined to the posterior lateral margin of the epimeron.

The most marked point of difference between the two species is in the form of the abdominal shield and of the uropoda.

In figs. 2 and 12 of Pl. VIII. are drawings of the abdominal shield in the two species; in *Acanthocope spinicauda* (fig. 12) the telson is very much longer than it is in *Acanthocope acutispina*, but at the same time the lateral spines are rather shorter in proportion to the length of the abdominal shield than in the last named species. The antennules are also remarkably different; the shortness of the flagellum of *Acanthocope acutispina* contrasts with the very long flagellum of *Acanthocope spinicauda*. The uropoda of *Acanthocope acutispina*, have only three joints; those of *Acanthocope spinicauda* five.

Station 302, south-east of Valparaiso, December 28, 1875; lat. 42° 43′ S., long. 82° 11′ W.; depth, 1450 fathoms; bottom temperature, 35°·6 F.; Globigerina ooze.

Family ARCTURIDÆ.

Arcturus, Latreille.

Arcturus, Latreille, Le Règne Animal, 1829, t. iv. p. 139.

It appears to me to be quite necessary to separate *Arcturus* and *Astacilla*. It is true that the very remarkable elongation of the fourth segment of the thorax in *Astacilla* is an adult condition not met with in the young, as the Rev. T. R. R. Stebbing has pointed out. This is no reason, however, for uniting together the two genera, which differ also in other characters, particularly in the brood cavity which is formed by four pairs of lamellæ in *Arcturus*, and by only one pair developed upon the fourth segment of the body in *Astacilla*. I may also point out another difference, and that is in the hinder thoracic limbs, which are biunguiculate in *Astacilla* and uniunguiculate in *Arcturus*; as this character is evidently of importance in discriminating the genera of Asellidæ it probably should not be ignored in the present case.

The genus *Arcturus* as thus limited is known by only four species exclusive of those to be described in the present Report; these are *Arcturus baffini*, *Arcturus hystrix* and *Arcturus tuberosus*, from the Arctic region, and *Arcturus coppingeri* from Patagonia. To these I am able to add ten new species, most of which are from deep water. Three of the above mentioned species, viz., *Arcturus hystrix*, *Arctura tuberosus*, and *Arcturus baffini*, range into deep water, and the genus so far as it is known at present is characteristically a deep-sea genus.

Arcturus furcatus, Studer (Pl. XXV. figs. 6, 7).

Arcturus furcatus, Studer, Sitzungsb. d. Ges. Naturf. Freunde, Berlin, 1882, p. 57.

The present species has been fully described and figured[1] by Professor Studer, from examples obtained at Kerguelen by the German steam ship "Gazelle." The Challenger acquired a very large number of specimens from shallow water up to 120 fathoms at various localities at Kerguelen, and also further to the south, off Heard Island. In addition to these specimens from shallow water a single specimen was dredged from deep water (1675 fathoms), at the southernmost station, Station 158, close to the Antarctic ice barrier, and this appears to be identical with *Arcturus furcatus*. The occurrence of the same species in deep and in shallow water is most unusual (see p. 158).

Although Professor Studer has defined the characters of this species with great accuracy, I think it worth while to give a short recapitulation in order to compare it with other species.

[1] Isopoden gesammelt während der Reise S.M.S. "Gazelle," &c., *Abhandl. d. k. Akad. d. Wiss. Berlin*, 1885, p. 12 (of Memoir), pl. i. fig. 3.

The specific characters of *Arcturus furcatus* are as follows:—

The length of the largest specimen, a male, is 41 mm., the antennæ measure 44 mm.

It most closely resembles *Arcturus spinosus*, but differs from that species in a number of characters, and is clearly distinct.

The antero-lateral margin of the head (Pl. XXV. fig. 6) is furnished with a short forwardly directed spine which is wanting in *Arcturus spinosus*.

Between the eyes are a pair of long spines, which instead of being nearly parallel to each other in their direction as in the latter species, are inclined outwards nearly at right angles; behind these are a pair of shorter spines, and the hinder region of the head is covered with tubercles.

Of the four anterior thoracic segments the fourth is the longest; each of the segments bears a stout ridge posteriorly, covered with spines and tubercles, which are disposed as in the females of *Arcturus spinosus* (see description, p. 88), the spines are shorter and blunter than in the males of that species and are more abundant; the tubercles between the spines are also better developed.

The most striking difference between the two species is in the abdominal segments and the caudal shield; in *Arcturus spinosus*, as already mentioned, the two sexes differ in the relative development of tubercles in this region of the body; they are much more strongly marked in the female than in the male. In both sexes of *Arcturus furcatus* the abdominal segments and the caudal shield are covered with numerous stout short spines of unequal length, and curved backwards; a comparison of my figures of *Arcturus spinosus* (Pl. XX. figs. 1, 2) with Studer's figure of *Arcturus furcatus* (*loc. cit.*, pl. i. fig. 3) will show this difference, which is very striking and serves at once to distinguish the two species.

Betsy Cove, Kerguelen, January 14, 1874; depth, 7 fathoms; volcanic mud.

Station 149B, off Royal Sound, Kerguelen, January 17, 1874; lat. 49° 28′ S., long. 70° 30′ E.; depth, 25 fathoms; volcanic mud.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; lat. 48° 45′ S., long. 69° 14′ E.; depth, 127 fathoms; volcanic mud.

Station 151, off Heard Island, February 7, 1874; lat. 52° 59′ 30″ S., long. 73° 33′ 30″ E.; depth, 75 fathoms; volcanic mud.

Station 153, Southern Ocean, February 14, 1874; lat. 65° 42′ S., long. 79° 49′ E.; depth, 1675 fathoms; bottom, blue mud.

Arcturus glacialis, F. E. Beddard (Pl. XXI. figs. 1–4).

Arcturus glacialis, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 111.

This new species of *Arcturus* agrees with *Arcturus spinosus* and *Arcturus furcatus* in the extraordinary development of spines upon the carapace and limbs; it comes

nearest to the latter species, but can be distinguished at a glance from either by the fact that the spines are more numerous and more slender.

One example was dredged at Station 153 close to the Antarctic ice barrier, being the southernmost point at which the Challenger took soundings.

The specimen is a female and measures 32 mm. in length; the antennæ were unfortunately broken.

The carapace is densely covered with short slender spines which extend on to the thoracic appendages and uropoda. The spines are of equal length or nearly so, only a few being conspicuously longer than the rest.

The dorsal anterior margin of the head is excavated by a shallow semicircular notch; the lateral margin is straight and its lower angle is not produced into a spine as in *Arcturus furcatus*. Between and in front of the eyes are a pair of long spines, inclined somewhat outwards from each other, but not at so wide an angle as are the corresponding spines of *Arcturus furcatus*. Behind these the surface of the head is convex and bears a single row of spines, of which the two on either side of the median line are considerably longer; in front is another band of small pointed tubercles.

The first four thoracic segments are subequal in length and furnished with abundant spines which are disposed as follows in each segment; the posterior part of the segment is ridged as in so many other species, the ridge widening out laterally to occupy the whole of the segment; this ridge is everywhere closely beset with spines which even in its narrowed sections are disposed in two rows; laterally the number of rows of spines is of course largely increased. On the anterior part of the segment, but some way from its anterior boundary, is a slight ridge bearing a single row of similar spines. In all except the first segment there are a pair of short spines between these two ridges, one on either side of the median dorsal line.

The epimera of these segments (that is, of the three posterior) are short, and so covered by the tergum as to be invisible on a dorsal view; their free margin is beset with spines. As is so generally the case (*cf.* description of *Arcturus spinosus*, p. 89) the epimera of the fourth thoracic segment are prolonged towards the median ventral line into a long curved spine which supports the ovigerous lamellæ.

The three posterior thoracic segments decrease in length from before backwards; the first of them is conspicuously the longest; each is ridged posteriorly; the ridge widens out laterally and comes to occupy the whole of the segment; it is beset with spines which, however, disappear at the dorsal median line. In the ventral median line the first of these three segments has an oval convexity; in the second segment this convexity is also present and terminates anteriorly in a freely projecting sharp spine which is directed forwards; the third segment has two such spines, one in front of the other; the anterior spine is directed forwards, the posterior backwards. Both *Arcturus furcatus* and *Arcturus spinosus* differ from *Arcturus glacialis* in these respects (*cf.* the description

of the former species). The three free abdominal segments are only separated from each other by a suture laterally; dorsally they are completely fused. Each bears a row of spines dorsally, which spread out laterally to occupy the whole of the segment. The first abdominal segment has a pair of short spines on either side of the ventral median line but in front of the anterior extremity of the uropoda; these are directed downwards and are approximately parallel to each other.

The caudal shield is covered with numerous longitudinal rows of spines and pointed tubercles which are directed backwards; on either side of the posterior extremity, and just above the lateral margin, is a long curved spine similar to those found in so many other species. The posterior extremity of the caudal shield is straight, and not bent upwards and pinched in as in *Arcturus spinosus* and *Arcturus furcatus;* the dorsal median line is devoid of spines and bears a longitudinal groove.

The thoracic appendages (figs. 3, 4) are furnished with numerous spines on the posterior of the joints, which decrease in number towards the distal extremity of the limb. The uropoda are also beset with a number of sharp pointed tubercles.

Station 153, Southern Ocean, February 14, 1874; lat. 65° 42′ S., long. 79° 49′ E.; depth, 1675 fathoms; blue mud.

Arcturus spinosus, F. E. Beddard (Pl. XX. figs. 1–11).

Arcturus spinosus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 110.

Eleven examples of this fine species were dredged in deep water (1375 fathoms), to the west of Kerguelen Island, eight females and three males.

It is very noticeable on account of the great development of spines over the surface of the body, a character which is met with in several other deep-sea species, as well as in certain of the Kerguelen shallow-water *Arcturi, e.g., Arcturus furcatus* (*vide* p. 85).

Besides the possession of ovigerous lamellæ by the female and of a penial filament by the male, the two sexes are distinguishable by a number of other small but constant differences.

In the female the anterior portion of the thorax is considerably wider than it is in the male; a difference which is of course correlated with the presence of ovigerous lamellæ in the former sex. The two sexes also differ very considerably in the development of spines upon the body, the females being invariably much more spiny than the males. These distinctions, which are especially marked in the abdominal region of the body, will be considered in detail in the following description of the species.

Length of the largest specimen 48 mm., length of antennæ 60 mm.

The anterior margin of the head is excavated; on either side of the median dorsal line, between and a little in front of the eyes, are a pair of long spines inclined upwards and slightly outwards; behind them, and corresponding to them in position, are a pair

of shorter spines; in the female there is an additional pair of spines shorter still and situated outside of them.

Of the first four thoracic segments the fourth is the longest in the male; in the female all four are subequal. Each of these segments is traversed by a posterior ridge, which is narrow dorsally and only occupies the posterior extreme of the segment; laterally this ridge becomes wider and comes to occupy the whole of the surface; it is here divided by furrows into several convex areas, which are roughened and tubercular, besides bearing long spines. In the first three thoracic segments in the male the ridge bears three pairs of long spines situated at approximately equidistant intervals; the median pair are the shortest and the rest increase progressively in length up to the most laterally placed pair, which are situated just dorsal of the epimera.

The fourth thoracic segment of the male only possess two pairs of long spines upon the tergum, a median pair and lateral pair, situated just above the epimera and considerably anterior to the median pair, owing to the increased length of the segment. The epimera of this segment has also a long spine, which is covered and concealed on a superficial view, by the lateral spine of the tergum. The epimera of the anterior segments have no such a spine.

In the female the first thoracic segment has four pairs of spines, the rest having them as in the male; there are also a number of short sharp spines developed between the principal ones; the lateral margins of the epimera are also furnished, in all these segments, with several short spines, that on the last being the longest. On the fourth thoracic segment, as in *Arcturus glacialis* (p. 87), the epimera are particularly large and project inwards, nearly meeting in the median ventral line; besides the lateral spine they give off a large posterior curved spine, which is closely applied to the ovigerous lamellæ and doubtless contributes towards their support; there are rudimentary equivalents of this spine on the anterior segments.

Each of the first four thoracic segments in both sexes has a short ridge in front of the posterior one, from which arise a single row of tubercles, blunter in the male and sharper in the female; in the first segment this ridge is wider antero-posteriorly than in any of the following segments.

Of the three posterior thoracic segments the first is the longest in both sexes; the posterior portion of each segment is ridged, the ridge being narrow dorsally and wide laterally; it is covered with tubercles, which again are more strongly marked in the female than in the male. On the sides of the tergum, anterior to the ridge in the first, is a single conspicuous tubercle; beneath this, and situated a little behind the articulation of this segment with that in front, is a strong ridge with a sharp forwardly directed edge traversing the ventral side of the segment; uniting the tubercles of either side, at the posterior margin of the segment, is a median V-shaped notch, on either side of which are a pair of short spines; the two remaining segments have a single ridge in

both sexes, the second segment has two pairs of short median ventral spines placed between the appendages, one in front and one at the posterior margin of segment; the third, a very long spine placed relatively further backwards, behind the articulation of appendages instead of in front, and another spine corresponding in position to the anterior pair of the segment in front; these are to be found in both sexes. The epimera of the three posterior thoracic segments have a large lateral spine in both sexes, and a shorter posterior spine behind the articulation of limbs.

The three first abdominal segments are distinct; the first has ventrally, near to the middle line, two pairs of short spines, one behind the other. Dorsally the segments are roughened and tuberculate, the tubercles being stronger in the female; the last free abdominal segment has a lateral spine on either side, placed just on the boundary line between it and the caudal shield; this spine is completely absent in the male.

The caudal shield terminates in a sharp median spine and in two lateral spines considerably longer than the median one, which are curved upwards and directed somewhat outwards; the surface of the caudal shield is covered with rounded tubercles in the male; in the female these tubercles on the side of the caudal shield are produced into short spines, a pair of which, situated just in front of the lateral terminal spines, are longer than the rest; in the male specimen, to which the above description applies, one of these additional spines was present.

Two smaller male examples, one measuring 41 mm., the other 36 mm., in length, presented certain differences from the adult male above described. The development of spines was considerably less; on the head only the anterior pair of spines were present, and on the first three thoracic segments only two pairs of long spines, the median pair being absent; the fourth thoracic segment had only the lateral spines in one specimen (the larger); in the other the dorsal pair were also present. In female examples of a corresponding age and size the spines were in one or two instances somewhat less developed than in the more mature examples; there was nevertheless no possibility of confounding the sexes as regards the secondary character.

The *antennules* (fig. 9) reach two-thirds of the way along the third joint of the antennæ.

The two basal joints of the *antennæ* (fig. 10) are very short; the third joint is nearly three times the length of the two taken together; the fourth and fifth joints are subequal, and each twice as long as the third joint; the flagellum is rather more than half the length of either of the distal joints.

The *thoracic appendages* (figs. 5, 7) in the female have a few short spines on the proximal joints along the posterior surface; in the male (figs. 6, 8) it is only the three last appendages which are thus provided.

The *uropoda* (figs. 2, 4) are tuberculate.

Station 146, off Marion Island, December 29, 1873, lat. 46° 46′ S., long. 45° 31′ E.; depth, 1375 fathoms; bottom temperature, 35°·6 F.; Globigerina ooze.

Arcturus anna, F. E. Beddard (Pl. XIX. figs. 1–5).

Arcturus anna, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 107.

A single female example of this species was obtained in deep water off the east coast of South America.

The specimen measures 37 mm. in length exclusive of the antennæ, which are very long, measuring altogether 64 mm., with the exception of the extreme tip which was broken off.

The head is excavated in front and bears two large lateral eyes of a somewhat triangular form with rounded angles; it is sharply marked off, at least laterally, from the anterior segment of the thorax.

The anterior lateral margin of the head is notched ventrally.

The first four thoracic segments are subequal in length; each is traversed by a ridge which dorsally is narrow and occupies only the posterior portion of the segment; laterally the ridge upon each segment expands in width and comes to occupy the whole of its superficies; in this region the ridge upon the segment is not uniform, but traversed by several shallow furrows which divide it into two or three rounded emminences. At the extreme lateral margin, just before the articulation of the epimera, is a longish stout spine inclined more or less at right angles to the longitudinal axis of the body, and slightly bent downwards; behind are one or two shorter spines along the postero-lateral border; the epimera which are short and not visible on a dorsal view of the animal, are likewise furnished along their free border with one or two spines; these are only conspicuously developed upon the last two of the segments, especially upon the last, where one of the spines equals in length the spine upon the terga, and lies directly beneath it. Each of these first four segments has another slight ridge upon the dorsal surface, placed about half way between the posterior ridge and the anterior boundary of the segments; this ridge is thicker upon the first thoracic than upon any of the succeeding segments; laterally the anterior ridge of each segment disappears and does not come into contact with the widened portion of the posterior ridge.

The three posterior thoracic segments are together equal in length to the third and fourth; of these the first is distinctly the largest. Each is ridged posteriorly, and the ridge widens out laterally to occupy the whole of the segment; it is here divided by a suture passing obliquely from above downwards and backwards into two convex areas; the lower convexity, which is the epimera, bears a stout spine which projects over the articulation of the limbs; the epimera are not visible on a dorsal view; in the most anterior of the three segments the epimera has in addition an equally long spine placed in front of the other, and directed forwards instead of outwards; each segment also has on either side a short lateral spine corresponding to those on the preceding segments but considerably smaller.

There are two completely free abdominal segments, the third being to a large extent fused with the caudal shield; these segments decrease in size from before backwards; the first is as long as any one of the first four thoracic segments, the second is not much shorter, while the third is not more than half as long as the first.

The first abdominal segment is divided into two distinct portions by a circumferential furrow; the anterior portion is considerably shorter, and bears on the ventral side of the segment a short spine on either side, the posterior half of the segment is smooth and convex and has a pair of long, somewhat backwardly curved spines, corresponding to the short ones in front, and situated just in front of the smooth area against which the anterior extremities of the uropoda play; this segment as well as the next has on each side a short lateral spine. The third abdominal segment has on each side a long curved spine situated at the postero-lateral margin of the segment, just in front and on a line with the flattened margin of the caudal shield. The caudal shield has a central convexity bordered by a flattened area which commences just behind the curved spine of the segment in front; the lateral margin is serrate, especially posteriorly, and terminates in a pointed extremity on either side which projects beyond the termination of the central portion of the caudal shield; the latter terminates in a short median spine.

The *antennules* are short, not reaching much beyond the second joint of the antenna.

The joints of the *antennæ* (fig. 5) increase progressively in length, the fourth and the fifth being, however, subequal; the inferior surface of the second joint of each antennæ is a very downwardly pointing spine, as in its near ally *Arcturus cornutus*; the flagellum consists of more than eighteen joints and is longer than the terminal joint of the organ.

The anterior *thoracic limbs* are not markedly longer than the posterior.

The proximal joints of the second, third, and fourth thoracic appendages (fig. 3) are furnished with longish spines, one or two to each joint, like those upon the segments; the posterior thoracic limbs (fig. 4) have no such spine, with the exception of the last, which have a single spine about half way along the proximal joint. The arrangement of the spines upon the thoracic limbs is as follows: the proximal joint has a single spine in the first two of these pairs of appendages and an additional one in the fourth pair of ambulatory limbs; the second and third joints have a single spine, which is not very long, close to the articulation of the joint with the succeeding one.

The free margins of the *uropoda* where they come into contact with each other are serrate (fig. 2).

Station 320, off Rio de la Plata, February 14, 1876; lat. 37° 17′ S., long. 53° 52′ W.; depth, 600 fathoms; bottom temperature, 37°·2 F.; green sand.

Arcturus cornutus, F. E. Beddard (Pl. XIX. figs. 6–12).

Arcturus cornutus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 108.

This species, also from the deep sea, bears some resemblance to *Arcturus anna*, but is evidently a distinct species, as will be seen from the following description, which refers to a single female example.

The specimen measures 36 mm. in length; the antennæ measure 64 mm.

The proportions therefore agree as nearly as possible with those of *Arcturus anna*.

The margin of the head is excavated in front and dorsally, the lateral margin of the head below in front of the eye is notched; between the eyes are a pair of long forwardly curved spines; behind the eyes a pair of blunt tubercles.

The first three thoracic segments are subequal and a little longer than the fourth. The posterior portion of each of these is occupied by a ridge which is narrow dorsally, but considerably wider laterally; dorsally this ridge is quite smooth and even, but laterally it is divided by an antero-posterior furrow into two principal convex protuberances; the largest of these eminences placed about half way between the dorsal median line and the lateral margin of the tergum is furnished with a long spine; there is also another spine of equal length set upon the lateral margin of the tergum projecting over the epimeron; behind this on the fourth segment is another spine more slender but not quite so long, springing from the lateral margin of the tergum and projecting backwards; there are indications of similar spines upon the anterior segments, but in no case are they more than sharp points which, however, increase in length from before backwards; on the first thoracic segment the more dorsal of the two spines upon the tergum does not accurately correspond in position to that upon the following segments; it is placed relatively behind and below them. The epimera of the second, third, and fourth segments have a single spine near to their posterior margin; the length of this spine increases progressively from before backwards, in the second and third of those segments the margin of the epimeron projects in front of the spine into a broadly conical process which is not represented in the fourth segment.

In front of the posterior tergal ridge, and close to the anterior margin of the segment, is a pair of blunt tubercles united by a slight ridge. The first segment has in addition a single tubercle placed in front again of this ridge, and just on the boundary line between the head and the first thoracic segment.

Of the three posterior thoracic segments the first is a trifle the longest. Each is ridged; the dorsal part of the ridge is narrow, straight in the first, concave backwards in the two last of the segments; laterally the ridge is widened out and bears on either side a single long spine directed outwards and a little backwards. The epimera of these segments are large, and each has a long spine, almost exactly underlying that upon the tergum, directed outwards and rather more downwards; the first of these segments has

in addition another longer anterior spine directed forwards, and almost at right angles to the posterior spine.

Of the three free abdominal segments the middle one is rather the largest, the first is separated by a complete and distinct suture from the second; the second is separated from the third by a suture which is incomplete dorsally, though present at the sides; the third segment is practically fused with the caudal shield. Each segment has a long lateral spine curved somewhat backwards, and corresponding exactly in position with those upon the posterior thoracic segments; that of the third segment is the longest; continuous with this is a row of one or two sharpened tubercles extending nearly across the segment, the median dorsal region being flattened and smooth; the first abdominal segment, although perhaps rather narrower dorsally than the second segment, has a ventral area which is considerably longer; on this are borne two pairs of spines in addition to the lateral spines; the most anterior pair are close to the median ventral line and to the anterior margin of the segment; the posterior pair are very much longer and placed further from the median line and just at the posterior boundary of the segment. The caudal shield is distinctly keeled and terminates in a sharp upturned point; on either side of this is a single row of curved hook-like spines; the lateral margins of the caudal shield are flattened, serrated posteriorly, and end in a sharp spine.

The *antennules* (fig. 8) extend a little way along the third joint of the antennæ.

The two last joints of the *antennæ* are extremely long, the first measuring 20 mm., the second 22 mm.; the second joint has a short spine on the dorsal surface (fig. 9) and a long spine ventrally; the flagellum is nearly as long as the last joint.

The anterior *ambulatory limbs* (fig. 12) have longish spines upon the proximal joints; there are no such spines upon the posterior limbs (fig. 11). The second, third and fourth ambulatory limbs have a long spine upon the second and third joints close to the articulation with the succeeding joints; the two last of these appendages have also a pair of longish spines upon the proximal joint which appear to be wanting in the second ambulatory appendage.

The *uropoda* have two long curved median spines exactly equivalent in position to the posterior pair of ventral spines upon the first abdominal segment; behind are a row of similar but smaller spines, and outside these a row of smaller spines still.

Station 214, off Samboangan, February 10, 1875; lat. 4° 33′ N., long. 127° 6′ E.; depth, 500 fathoms; bottom temperature, 41°·8 F.; blue mud.

Arcturus spinifrons, Beddard (Pl. XXV. figs. 9–12).

Arcturus spinifrons, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 108.

Two examples of this small species were dredged a little to the south of the Fiji Islands from a depth of 600 fathoms.

Both specimens are males, the larger measures 13 mm. in length, the antennæ being 20 mm. in length.

Unlike so many other deep sea species, *Arcturus spinifrons*, has no development of spines upon the carapace with the exception of a single pair on the head; the body is, however, very tuberculate.

The anterior margin of the head is notched in a semicircular fashion; the anterior part of the head is smooth save for two long spines which lie between the eyes; the posterior part of the head is convex and divided by furrows into three prominences, one median and two lateral, which are closely covered with tubercles. The lateral margin of the head, as in *Arcturus anna*, is excavated by a ventral semicircular notch.

The four anterior thoracic segments are equal in size. Each has a posterior ridge which widens out laterally; the anterior margin of the ridge is concave; the lateral regions are separated by a furrow from the median and both are densely covered with tubercles; the epimera are short and inconspicuous, and appear to be smooth or at least not so rough as the terga.

The anterior concave margin of the ridge closely embraces an oval convexity which lies close to the anterior margin of the segment; in the first segment this convexity is divided by a tranverse line of division into two equal halves, each of which bears a single row of tubercles; these regions are also densely tuberculate in the following segments.

The fourth thoracic segment has a row of short tubercles arranged in a semicircle with the concavity directed backwards upon the ventral surface; the dorsal oval convexity is not so large as in the two preceding segments, and has only two tubercles, one at either extremity.

Of the three posterior segments of the thorax, the first is the largest, the second and third being smaller and subequal; each of the segments is traversed by a strong ridge which is covered with tubercles; the first of the segments has a number of short tubercles scattered over the ventral surface, and the two succeeding segments are ridged in the same region.

The segments of the abdomen are comparatively smooth, being only slightly roughened laterally; the caudal shield is smooth with the exception of the lateral margins which are serrate; it terminates in a short median spine.

The *antennules* extend half way along the third joint of the antennæ.

In the *antennæ* the terminal joint is the longest, measuring 6 mm., the penultimate joint measures 5 mm.; the flagellum is of about half the length of the terminal joint.

The *thoracic appendages* are roughened and tuberculate on the proximal joints.

The *uropoda* bear a single median longitudinal row of tubercles.

Station 174c, off Kandavu Island, August 3, 1874; lat. 19° 7′ 50″ S., long. 178° 19′ 35″ E.; depth, 610 fathoms; bottom temperature, 39° F.; coral mud.

Arcturus purpureus, F. E. Beddard (Pl. XXIV. figs. 5–8).

Arcturus purpureus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 109.

A single specimen of this species was dredged in the North Atlantic at Station 23, from a depth of 450 fathoms.

I have named it *purpureus* on account of the purplish colour which appears to characterise the species, and is very distinct in the spirit-preserved specimen.

It is closely allied to *Arcturus anna* and to *Arcturus cornutus*, but differs sufficiently from both to constitute the type of a new species.

The extreme length of the specimen, which is a female, is 18 mm., the length of the antennæ 31 mm.

On the head between the eyes are a pair of long forwardly curved spines; the hinder portion of the head is occupied by a rounded median convexity; at the antero-lateral margin of the head is a very short forwardly directed spine, beneath which the margin is excavated by a semicircular notch.

Of the first four thoracic segments the fourth is rather the shortest. Each of the segments bears an outwardly directed spine on each side of the body corresponding to the pair on the head, and of about equal length; those on the fourth segment, although broken, appeared to have been originally somewhat shorter; close to the lateral margin of each segment, near to its junction with the epimeron, is another long spine projecting outwards and over the epimeron. The first segment differs from the succeeding ones in having no separate epimeron, and its lateral margin has two spines instead of one, of which the anterior is the longer; they are both directed forwards as well as outwards. The fourth thoracic segment has also a second spine, and its postero-lateral margin inclined downwards and backwards as well as outwards.

Of the three posterior thoracic segments the first is the largest, the two posterior being equal in size; the epimera of all three segments bears a spine directed outwards, and at right angles to the longitudinal axis of the body; that of the first of the three segments is considerably the longest; this segment bears also a pair of spines upon the tergum continuous with those on the segments in front, and exactly overlying that on the epimeron.

The first three segments of the abdomen are separated by distinct sutures; the first and the third of the segments have a pair of long lateral spines; those of the third segment mark the boundary between it and the caudal shield; the first abdominal segment has a pair of short ventral spines placed on either side of the median ventral line, and upon a ridge which forms the posterior margin of the segment; anteriorly the segment is bounded by a similar ridge, but without any distinct spines.

The caudal shield is oval and convex, with a faintly marked, longitudinal carina which terminates in a long spine; the lateral margins of the caudal shield are flattened and

form a ridge like the brim of a hat; on either side are two long curved spines situated at equidistant intervals, and corresponding in position to the lateral spines on the last abdominal segment; the lateral ridge does not terminate in a flattened spine on either side as in so many other species.

The appendages in many cases bear long spines like those upon the body; the *antennæ*, which are very long, have a pair of spines upon the distal extremity of each of the joints; the *anterior thoracic appendages* (fig. 7) are furnished with a number of stout spines upon the proximal joints; the *posterior thoracic appendages* (fig. 8) are smooth and devoid of any such spines.

The *uropoda* are covered with numerous minute granulations but bear no spines.

Station 23, March 15, 1873, off Sombrero Island; lat. 18° 24′ N., long. 63° 28′ W.; depth, 450 fathoms; Pteropod ooze.

Arcturus brunneus, F. E. Beddard (Pl. XXII. figs. 1–4).

Arcturus brunneus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 108.

This species, like so many other of the deep-sea forms, is extremely spiny; on this account it presents a very strong general resemblance to *Arcturus spinosus* and to *Arcturus purpureus*, but is evidently to be regarded as a distinct species.

The specific name was suggested by the fact that many of the spines, and in one individual the entire body also, were of a dark brown almost black colour.

Four individuals, two males and two females, were dredged near to Kerguelen in 1600 fathoms of water.

The species is small, the largest specimen measuring only 19 mm.

The antennæ are of about the same length as the body.

The head is furnished with two long spines between the eyes and a pair of shorter spines behind them; in the female the posterior pair of spines are distinctly longer than in the male.

The first four segments of the thorax are subequal in length, the fourth being perhaps a trifle the longest. The thoracic segments are raised into a ridge which dorsally only occupies the posterior region of the segment, but laterally becomes much wider and occupies the whole of the sides; on the ridge are planted a number of long straight spines.

On the first segment in the male there are four of these, equidistant from each other, and a minute lateral spine at the extreme lateral margin; in the female (fig. 1) the lateral spines are longer, and there is a small spine between the lateral and dorso-lateral spine behind them; on the second segment in the male the same spines are developed, but the lateral spine, which is placed upon the epimeron, is longer, and there is a minute tubercle between it and the lateral tergal spine; in the female the arrangement of spines is the same,

but the small lateral tubercle of the male has become developed into a long spine. The third and fourth segments of the male have exactly the same spines, with the addition of another spine which replaces the lateral tubercle of the second segment, and a short median dorsal spine; the female is much the same. On the second, third and fourth segments there are in both sexes a single transverse row of longish spines near to the anterior margin of the segment.

Each of the three posterior thoracic segments bears a ridge with a single row of long spines arranged at equidistant intervals; there are three pairs of spines, one pair epimeral, and in the female several shorter ones in addition.

The first abdominal segment has a single row of comparatively short backwardly-curved spines; on the second and third segments these spines become considerably longer, especially the lateral spine on either side which marks the anterior extremity of the caudal shield.

The caudal shield in both sexes is covered with longish curved spines; just above and near to the termination of its lateral margins are an extremely long pair of spines directed outwards and slightly upwards.

The *antennules* extend half way along the third joint of the antennæ.

The first three joints of the *antennæ*, more particularly the third joint, are furnished on the upper surface with spines; there are four or five of these spines on the third joint. The fourth and fifth joints are longer than the third joint; they have no spines, but like the preceding joints, are also beset with numerous fine long hairs; the flagellum is moderately short, barely half as long as the fifth joint, and consists of about seven rings.

The proximal joints of the *thoracic appendages* (fig. 3–6) are furnished with spines.

The *uropoda* are tuberculate in the male and covered with short curved spines in the female.

Station 147, December 30, 1873; lat. 46° 16′ S., long. 48° 27′ E.; depth, 1600 fathoms; bottom temperature, 34°·2 F.; Diatom ooze.

Arcturus abyssicola, F. E. Beddard (Pl. XXI. figs. 5–8).

Arcturus abyssicola, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 111.

Of this species again only a single specimen was obtained by the Challenger; the specimen is unfortunately mutilated, the abdomen having been broken off and lost. The species is interesting from the fact that it was dredged in water of 2385 fathoms, nearly the greatest depth at which any genus of Isopods is known to live. In other respects it is not remarkable.

The head and thorax measure some 15 mm. in length, the antennæ, which are of great size, 42 mm.

Of the first four thoracic segments the second and third are equal in size, and rather

longer than the first and fourth. Each of the four segments is ridged posteriorly, the ridge being very narrow dorsally and widening out laterally as in other species; at the junction of the tergum with the epimeron is a short blunt lateral tubercle, which overhangs and completely conceals the latter when the animal is viewed dorsally; the epimera, which are extremely short, are produced into a similar tubercle which exactly underlies that of the tergum; on the first segment the tubercle is prolonged into a spine.

The three posterior thoracic segments are shorter than any of the four anterior ones; the first is the longest of the three; on its inferior surface is a transverse ridge which reaches nearly right across the segment and bounds it anteriorly; each of the segments has a posterior ridge; laterally there is a large rounded convexity separated by a shallow furrow from the ridge and from the epimeron; the latter is smooth.

The *antennules* reach about half way along the third joint of the antennæ.

The two basal joints of the *antennæ* are very short; the third is twice the length of the first two; the fourth is half again as long as the third; the fifth is longer still and the flagellum half as long again.

The anterior thoracic appendages (fig. 7) are furnished with one or two short spines upon the proximal joints, the posterior thoracic appendages (fig. 8) have also a few tubercles on the basal joint.

At Station 184, off Cape York, two specimens of an *Arcturus* were dredged at a depth of 1400 fathoms, which appear to belong to the same species, though it is rather difficult to speak with certainty owing to the imperfect condition of the specimen from Station 281, and the fact that the only perfect specimen from Station 184 was a female, while the example of *Arcturus abyssicola*, described above, is in all probability a male, as there were no traces of ovigerous lamellæ. This being the case, it will be better to describe the characters of the specimens without regarding them, for the present at least, as belonging to another species.

The anterior thoracic segments are rather shorter in proportion, but otherwise present pretty much the same characters.

The abdominal segments are convex dorsally; the first has a pair of short tubercles ventrally on either side of the median line; the sides of the segments are rather more roughened than the thoracic segments.

The caudal shield is keeled, and terminates in a blunt spine; it is covered with a few low scattered tubercles.

Station 281, October 6, 1875, near the Low Archipelago; lat. 22° 21′ S., long. 150° 17′ W.; depth, 2385 fathoms; bottom temperature, 34°·9 F.; bottom, red clay.

Station 184, August 29, 1874, between Australia and New Guinea; lat. 12° 8′ S., long. 145° 10′ E.; depth, 1400 fathoms; bottom temperature, 36°·0 F.; bottom, Globigerina ooze.

Arcturus myops, F. E. Beddard (Pl. XXII. figs. 5–8; Pl. XXV. fig. 8).

Arcturus myops, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 106.

The present species differs from any other *Arcturus* at present known by the fact that the eyes are entirely or almost entirely aborted. The two specimens which I include under the above specific name were dredged from a depth of 700 fathoms, off New Zealand. The only trace of eyes left are a pair of rounded elevations on either side of the head, which, as far as could be made out from the examination of a specimen mounted entire in Canada balsam, are not facetted and contain no pigment; the structure of the integument on these ocular convexities displayed no recognisable differences from the integument elsewhere.

The largest of the two individuals measures 10 mm. in length, and appears to be a male; the smaller specimen is of the same sex.

The margin of the head is excavated by a semicircular notch dorsally and anteriorly; the lateral margins are straight.

The first four thoracic segments are subequal in length; each is ridged posteriorly, the ridge as usual widening out laterally to occupy the whole of the segment; in the fourth thoracic segment the ridge is higher dorsally than in the three anterior segments. This ridge in all the segments is closely beset with fine granulations. Anteriorly, between the posterior ridge and the anterior margin of the segment, is a short ridge likewise covered with numerous granulations; the first thoracic segment has two of these ridges.

Of the three posterior thoracic segments the first is the longest; on each is a ridge-like elevation closely beset with granulations. The abdominal segments and the caudal shield are similarly roughened by numerous tubercles, the caudal shield is somewhat oval in form, tapering to its posterior extremity, which is slightly bent upwards.

The proximal joints of the *antennæ* (Pl. XXV. fig. 8) and of all the *thoracic limbs* (Pl. XXII. figs. 7, 8) are furnished with numerous tubercles. The *uropoda* are covered with minute granulations, and close to the inner margin of each of these appendages is a row of sharp-pointed, backwardly-directed tubercles.

Station 169, July 10, 1874, off New Zealand; lat. 37° 34′ S., long. 179° 22′ E.; depth, 700 fathoms; bottom temperature, 40° F.; blue mud.

Arcturus studeri, F. E. Beddard (Pl. XXIII. figs. 1–4).

Arcturus studeri, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 111.

A number of specimens of a small *Arcturus*, from the shores of Kerguelen, form the type of a new species which I dedicate to Professor Studer, who has done so much to increase our knowledge of the fauna of Kerguelen.

It is characterised as follows:—

Extreme length 28 mm., length of antennæ 30 mm.

The head bears dorsally two pairs of long spines, the anterior pair being in advance of the posterior pair which are behind the eyes; there are also a few short spines borne on a ridge which occupies the posterior region of the head and is continuous with the convexities which are topped by the hinder pair of spines; the lateral margin of the head is not a straight line at right angles to the longitudinal axis, but the lower portion is cut away as in *Arcturus purpureus*, &c., and meets the upper portion at an obtuse angle.

The four anterior thoracic segments are subequal, and each has a posterior ridge bearing a number of longer and shorter spines. On the first segment the spines upon the posterior ridge are disposed as follows:—there are a pair of minute tubercles, one on either side of the median line corresponding in position to the spines upon the head; laterally are two long spines equidistant from each other and from the median tubercles; the lateral margin of the tergum is prolonged into two outwardly and downwardly-directed spinous processes, of which the anterior is the longer. In front of the posterior ridge, and about half way between it and the anterior margin of the segment, is a shorter ridge which bears four small blunt tubercles, the two inner ones corresponding exactly in position to the median tubercles of the posterior ridge. On each of the three succeeding segments the number and position of these tubercles is identical; on each of these segments the posterior ridge, like that of the first thoracic segment, has two long spines upon each side of the body; the third and fourth segments have in addition another spine upon each side placed behind and between the two lateral spines; these are also present in rudiment on the two anterior segments, and in fact increase progressively in size from before backwards.

The margin of the epimera is prolonged into three spines, which are extremely short and inconspicuous in the second thoracic segment; in the third segment the two posterior spines are of considerable length; in the fourth the middle one is very long, while the posterior spine is broadened out into a long plate bearing secondary spines along its posterior edge and almost meeting its fellow on the opposite side; these processes are closely pressed against the ovigerous lamellæ, and their function appears to be to support them.

Each of the three posterior thoracic segments has two or three long spines on either side; the epimera are large and terminate inferiorly in two stout spines inclined outwards and downwards, and at an acute angle with each other.

The two anterior abdominal segments each consist of two regions, a narrower anterior and a swollen posterior portion, the former is smooth, the latter beset with spines and tubercles; on the first segment are two particularly long spines, one situated close to the ventral margin of the tergum just in front of the anterior extremity of the uropoda, which abut against the hinder region of this segment; exactly above this is another spine of equal length; on the second abdominal segment is a long spine on either side, placed much more dorsally than in the anterior segment. The third abdominal segment is shorter than the other two, and is closely fused with the caudal shield; it is roughly

tuberculated dorsally and has a long spine on either side, somewhat curved backwards and projecting at right angles, which is placed on a line with the lateral margin of the caudal shield. Ventrally these segments are furnished with spines arranged in the following fashion: the last thoracic segment has a single median spine of considerable length; the first abdominal segment has anteriorly a pair of short spines closely approximated, and on either side of the median line; posteriorly and just in front of the uropoda, the anterior ends of which abut against this segment, are a row of spines, of which two, one on either side, are particularly long, and have been referred to above.

The caudal shield has a dorsal keel which is prolonged posteriorly into a longish curved spine; the whole of its dorsal surface is covered with numerous tubercles pointed at their extremity. The lateral margin of the caudal shield forms a flattened serrate ridge, which terminates posteriorly in a flattened triangular spine on either side.

The proximal joints of the *antennæ*, as well as of the thoracic limbs (figs. 3–4), are furnished with numerous slender short spines; there are a pair of such spines, one upon each antennule, on the first joint; they are particularly abundant on the basal joint of the anterior thoracic limbs; the three posterior pairs of thoracic appendages have one or two such spines.

The *uropoda* are beset with numerous small spiny tubercles, and each has a longish curved spine placed nearly vertically below the long spines on the posterior free abdominal segment.

Station 149B, January 17, 1874, off Royal Sound, Kerguelen; lat. 49° 28′ S., long. 70° 30′ E.; depth, 25 fathoms; volcanic mud.

Station 149H, January 29, 1874, off Cumberland Bay, Kerguelen; lat. 48° 45′ S., long. 69° 14′ E.; depth, 127 fathoms; volcanic mud.

Arcturus oculatus, F. E. Beddard (Pl. XXV. figs. 1–4).

Arcturus oculatus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 112.

Five specimens of this small species were dredged in shallow water, off Melbourne, South Australia.

The largest measures no more than 6 mm. in length.

The most remarkable point about this species, and one which serves at a glance to distinguish it from any other recorded species of the genus, is the elevation of the eyes on stalks; these are, however, merely prolongations of the body-wall, and are not articulated with it by a joint as in the Decapoda. Nevertheless the approximation to the Decapoda in this respect is of some little interest, and is perfectly unique within the genus. In other respects the present species exhibits no marked divergences from other *Arcturi*, and I have not thought it necessary to separate it generically simply on account of the peculiarities in the peduncles of the eyes.

The frontal margin of the head is broad and truncated; it is not excavated by semicircular notch as in so many other species.

The first four thoracic segments are subequal in length, they are convex posteriorly, and flatter anteriorly; their surface, as of the body generally, is quite smooth and free from tubercles or spines. In the case of the last three of these segments, the epimera are furnished on each side of the body with a long spine, which is directed outwards approximately at right angles to the longitudinal axis of the body.

The fifth, sixth and seventh segments of the thorax, like the four anterior, possess a long spine upon each epimeron; each of these segments has in addition a lateral spine on either side situated about half way between the dorsal median line and the ventral margin of the tergum, extending outwards from the side of the body in a direction more or less parallel to that of the epimeral spine.

Of the three free segments of the abdomen two are furnished with a long lateral spine, which is absent from the middle one of the three.

The caudal shield is very convex and terminates in the median dorsal line in a short curved spine, as in so many other species of this genus. The lateral margin of the caudal shield is beset with a series of somewhat curved spines which are situated at equidistant intervals from each other; they correspond in position to the spines upon the first and third of the abdominal segments; the lateral margin of the caudal shield terminates in a longish flattened spine on either side, as in *Arcturus anna*.

On either side of the dorsal median line, and close to it, is another row of spines which runs from end to end of the caudal shield.

The *antennules* (Pl. XXV. fig. 2) are of considerable length proportionately to the antennæ; each is made up of four joints which decrease progressively in length from the first to the third; the fourth joint, which bears the olfactory hairs, is about equal in length to the first.

The *antennæ* (fig. 3) have two extremely short basal joints, of which the second bears a longish spine on the dorsal side, close to its articulation with the succeeding joint; the third and fourth joints are of equal length, and four or five times as long as the basal joints taken together; each has a similar spine at its distal extremity; the fifth joint is both longer and narrower than the preceding joints, it has no terminal spine; the flagellum is extremely short, about one-third as long as the terminal joint; it is composed of two segments only, the distal being the longer.

Another characteristic of this species is the great length of the thoracic appendages; of the four anterior pairs the first are as usual shorter than the rest and subcheliform; the second pair has the two proximal joints moderately short and subequal; the first joint has a long spine similar to those upon the thorax placed near to its articulation with the body; the third joint is as long as the two basal joints taken together, its inner margin is fringed as in other species with numerous long hairs; the fourth joint is of entirely

similar size and structure; the fifth joint is more elongated and slender, but similar in other respects; the distal joint forms a long claw, which is no thicker than the hairs which fringe the margins of the preceding joints; it is slightly swollen at its base and then serrate.

The two following pairs of appendages are perfectly similar, save for the fact that the basal joint becomes progressively longer; it is armed with a stout spine as in the preceding limbs.

The three distal thoracic appendages are in every case longer than the anterior pairs. The elongation of the thoracic limbs and the stalked eyes give this species a certain superficial resemblance to *Munna*. These appendages agree with each other and differ from the anterior thoracic limbs in the great elongation of the proximal joint; in the first two pairs of these appendages the proximal joint has a stout spine about halfway along its length.

The second joint is very much shorter, the third a trifle longer, the two together nearly equalling in length the first joint; the fourth and fifth joints are about equal respectively to the second and third, they show at any rate the same proportions; the sixth joint is short and is armed with a single terminal claw; the fourth and fifth joints are armed along the inner margin with stout sharp spines.

The *uropoda* are fringed along the inner margins, where they come into contact with each other, with about four spines which are equidistant, but do not commence until the latter half of the appendage. I did not observe any trace in these appendages of the minute distal joints which occur in other species and represent the endopodite and exopodite of the limb.

Station 161, April 1, 1874, off entrance to Port Philip; lat. 38° 22′ 30″ S., long. 144° 36′ 30″ E.; depth, 33 fathoms; bottom, sand.

Arcturus americanus, n. sp. (Pl. XXIII. figs. 5–8).

A single *Arcturus* dredged to the east of the Strait of Magellan, and the only species of the genus obtained by the Challenger from this locality, appears to be the type of a new species.

It presents certain resemblances to *Arcturus coppingeri* of Miers,[1] from the same region, but unless this form, like *Arcturus baffini*, has two varieties, one with dorsal spines and one where they are absent, there can, to my mind, be no doubt as to their distinctness.

The length of the single specimen, a female, is 21 mm.

The body, as in *Arcturus coppingeri*, is everywhere very densely covered with tubercles, more so than in any other species described in the present Report. The tubercles are, however, not so even as in the former species, a double row along the back being prolonged into stout blunt spines.

[1] Account of the Geological Collection made during the survey of H.M.S. "Alert" in the Strait of Magellan and on the coast of Patagonia, Crustacea, *Proc. Zool. Soc. Lond.*, pt. i. p. 75.

The anterior dorsal margin of the head is excavated by a deep semicircular notch; the lateral margins of the head are straight. The eyes are large and, as is so usually the case in this genus, are triangular in form. The whole surface of the head is closely covered with tubercles, of which two on either side of the median line and rather behind the eyes are larger and more conspicuous than the rest.

The body is broadest at the third thoracic segment; the fourth segment is, however, the longest. Each of the first four thoracic segments is ridged posteriorly; laterally the ridge widens out and comes to occupy the whole of the segment. The lateral margins of the terga project outwards beyond the epimera into a blunt smooth process.

On either side of the dorsal median line the posterior ridge bears two longish blunt spines, which are shorter in the first and fourth segments than in the two middle ones, where they are subequal.

The anterior region of each of these segments is also ridged and tubercular.

The three posterior segments of the thorax are likewise beset with numerous tubercles, a pair of which, one on either side of the dorsal median line, are stouter than the rest but not nearly so marked as are the corresponding spines of the anterior thoracic segments.

The caudal shield is ovoid, and terminates in two moderately long spines which are directed rather outwards; the surface of the caudal shield is beset with numerous tubercles which appear to be rather longer than those which cover the rest of the body; they are pointed and directed backwards.

The *antennæ* have unfortunately lost the flagella; the length of the peduncle is 19 mm.; the last two joints are elongated and increase progressively in length. The basal joints are roughened and tubercular, and the same is the case with the *thoracic limbs* (figs. 7, 8) and *uropoda*.

Station 313, January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.; depth, 55 fathoms; bottom temperature, 47°·8 F.; sand.

Arcturus stebbingi, n. sp. (Pl. XXIV. figs. 1–4).

This species is only represented by a single individual, a mature female with brood cavity developed; it was dredged in shallow water, 30 fathoms, off Kerguelen. I take the opportunity of dedicating the present species to the Rev. T. R. R. Stebbing, who has paid special attention to this genus.

Arcturus stebbingi cannot be confounded with either *Arcturus furcatus* or *Arcturus studeri*; for in both of these species the body is decked with long and numerous spines; in the present species the body is extremely tubercular, but only a pair of tubercles, on the

head, reach to any length; the antennæ are also considerably shorter relatively than in either of the two other Kerguelen *Arcturi*.

The nearest affinities of this species are with Miers' *Arcturus coppingeri* and with *Arcturus americanus*, from both of which it differs in the absence of the posterior spines upon the caudal shield, in the presence of a pair of spines upon the head, in the shortness of the antennæ and in the very short truncated caudal shield.

The specimen measures about 13 mm. in length: the anterior region of the thorax is extremely broad, as is often the case in the females of this genus (for instance in *Arcturus spinosus*, see p. 89).

The head is extremely short, and the large and prominent eyes are not far removed from its anterior margin; on the dorsal surface, between the eyes, are a pair of stout spines directed upwards but diverging from each other; behind these again, and corresponding to them in position, are a pair of very short spiny tubercles.

The thoracic segments gradually increase in length up to the fourth; there is not, however, much difference in this respect between the third and fourth. In the first three segments the dorsal surface is ridged and covered with strong blunt tubercles, of which two, one on either side of the median line, are particularly marked, at any rate in the second and third segments; in these segments also a prominent process overhangs the articulation of the appendages. The fourth segment is much less strongly ridged than the preceding; it is divided by superficial transverse furrows into three areas of about equal dimensions, the anterior is smooth and the middle area sparsely tuberculate ventrally; between the two is a roughened tuberculate area which overhangs the articulation of the limbs; the posterior region of the segment corresponds to the ridge on the anterior segments. The posterior thoracic segments are ridged and covered with rounded tubercles which are smaller and not so pointed as those of the anterior segments. The abdominal segments and caudal shield are closely beset with similar tubercles; the caudal shield is remarkably short, being hardly longer than the three free abdominal segments; it ends in a blunt somewhat upturned extremity; dorsally and laterally are a pair of pointed short spines.

The *antennæ* measure 9 mm. in length; the two distal joints are elongated and subequal, and like the proximal joints beset with numerous hairs and spines; the flagellum is shorter than the distal joint of the peduncle and is only three-jointed, as in *Astacilla*.

The proximal joints of all the thoracic appendages are roughened and tubercular (figs. 3, 4).

Station 149E, off Kerguelen Islands, January 21, 1874. Off Cape Maclear; depth, 30 fathoms.

Astacilla, Fleming.[1]

Leac[h]ia, Johnston, Edin. Phil. Journ., vol. xiii. (1825) p. 219.
Astacilla, Fleming, Encycl. Brit., ed. 7, vol. vii. p. 502.
Arcturus, Guérin-Méneville, Iconogr. d. Règne anim., t. xxxi. fig. 2, 1829–44.

I have already (p. 85) stated the reasons which necessitate the separation of this genus from *Arcturus*.

Unlike *Arcturus*, *Astacilla* is almost exclusively an inhabitant of the shallow waters, only one species, indeed, *Astacilla granulata*, ranging into deep water. The genus appears to be almost world-wide; it is known from the European and American coasts, from the Cape, from Australia and New Zealand, and in the present Report I have a new species to describe from Kerguelen.

Astacilla marionensis, n. sp. (Pl. XXV. fig. 5).

A single specimen dredged in 100 fathoms, off Marion Island, is the sole representative of this species, which does not present any very salient characters.

Its length is 8 mm. exclusive of the antennæ.

The head is notched anteriorly in the middle line; laterally and below it is prolonged into a short triangular process; the upper surface is very convex between the eyes, the separation between the head and the first segment of the thorax, which is fused with it, is marked by a furrow; this segment and the two following are subequal; the second and third segments have a pair of dorsal tubercles, one close to the median dorsal line, the other about half way between this and the lateral margin of the segment, the more dorsal tubercles are distinctly larger than the lateral ones; the first segment of the thorax appears to have a smaller unpaired median tubercle; the fourth segment of the thorax is greatly elongated, equalling in length the head and first three segments; it has ten or twelve tubercles arranged in pairs on either side of the dorsal median line; the posterior extremity of the segment is marked by a prominent hump on the dorsal surface.

Of the three posterior segments of the thorax the first is rather the largest; the anterior part of each segment is flattened, the posterior part is raised into a prominent ridge which occupies laterally the whole of the segment. On the first segment are a pair of prominent tubercles on either side; the most anterior of these is directed forwards; the posterior tubercle is more dorsal in position and directed upwards; these tubercles appear in the two succeeding segments to be represented by only one in the lateral region, which is much smaller; the epimera of the fifth segment are very much deeper than in the succeeding segments. The first two segments of the abdomen are distinctly separate, the third practically fused with the caudal shield; the first segment is smooth, the second has a pair of tubercles, one above the other, on each side of the body. The caudal shield has the

[1] I have followed Harger (Marine Isopoda of New England, U.S. Commission of Fish and Fisheries Report for 1878, Washington, 1880, p. 363), in retaining the name *Astacilla*.

form characteristic of this genus, it terminates in an elongated obtusely-pointed upturned extremity; on either side above the middle of its extent is a very prominent hooked tubercle curved backwards; the rest of its surface is smooth and free from tubercles.

The *antennules* are as usual very short and reach to the end of the second joint of the antennæ; the proximal joint is broad and stout and has a strong lateral ridge.

The *antennæ* are as long as the head and six anterior thoracic segments. The first joint is extremely minute, the second much longer, the third nearly twice the length of the second; the fourth nearly twice the length of the third; the fifth joint is rather shorter than the fourth. The flagellum is short, and consists of three joints which decrease progressively in length, the first being much the longest. The antennæ appear to be without any hairs.

The four anterior thoracic appendages are all similar to each other, and increase progressively in length.

The three posterior pairs are more or less similar to each other, and differ principally from the anterior thoracic appendages in the shortness of the distal joints in the absence of hairs and in the termination of the limbs in two claws; the distal joints are roughened by the presence of numerous minute tubercles.

The *uropoda* are comparatively smooth.

Two individuals, of which the largest measures 10 mm., were dredged in shallow water off Kerguelen; these specimens are to be distinguished from the ones described above by their intensely dark colour, which is owing to the presence of numerous pigment granules. In other respects they agree so closely that I cannot see any reason for distinguishing them by a different specific name.

Marion Island, 100 fathoms.

Kerguelen, Betsy Cove, surface and shallow water.

Arcturides, Studer.

Arcturides, Studer, Sitzungsb. d. ges. naturf. Freunde, Berlin, April 1882, p. 57.

This genus was founded by Studer for a small Arcturid dredged in shallow water at Kerguelen, by the German exploring ship "Gazelle;" it appears to form an intermediate type between *Arcturus* and *Idothea;* its general aspect is that of the former genus, while the similarity of all the thoracic limbs is a characteristic of *Idothea.*

Arcturides cornutus, Studer.

Arcturus cornutus, Studer, *loc. c.*

A number of specimens of this species were dredged in comparatively deep water, off Marion Island. Its vertical and horizontal range are therefore extended by the explorations of the Challenger.

Studer's description[1] of the species is so sufficient that I need not redescribe it.

Station 145A, December 27, 1873; lat. 46° 41′ S., long. 38° 10′ E.; depth, 310 fathoms; volcanic sand.

Family APSEUDIDÆ.

Apseudes, Leach.

Apseudes, Leach, Edin. Encycl., vol. vii. (1812), p. 404.
Eupheus, Risso, Hist. d. Crust. d. Nice, 1816, p. 124.
Rhœa, Milne-Edwards, Ann. d. Sci. Nat., xiii. (1828), p. 292.

Of the genus *Apseudes* three distinct species were dredged during the voyage of the Challenger; one of these is apparently a new species and is described in detail below; a second species would seem to be identical with Studer's *Apseudes spectabilis;* both these species are from Kerguelen; the third species, from shallow water off Sydney in Australia, I identify with Haswell's *Apseudes australis.*

There are not a great number of species of this genus known, and the majority of these are from the European seas; a remarkable form is Chilton's *Apseudes timaruvia* from New Zealand;[2] this species differs from all others of the genus by the absence of an exopodite to the antennæ and by the similarity of the fossorial limbs to the succeeding thoracic appendages; it would be interesting to have a little more information respecting this species, which may well, as Mr. Chilton suggests, be the type of a distinct genus.

The new species from Kerguelen described in the present Report does not present any special features of interest.

This genus is, so far as is known, confined to shallow water; no representatives from deep water have been described.

Apseudes antarctica, F. E. Beddard (Pl. XV. figs. 1–3).

Apseudes antarctica, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 114.

Among the Isopoda obtained at the Island of Kerguelen by the German ship "Gazelle," and figured and described by Studer in his account of the collections, is a species of *Apseudes*, named by him *Apseudes spectabilis;* during the Challenger Expedition a single specimen of this species was also obtained at Christmas Harbour, Kerguelen, which agrees so closely with Studer's description and figures that I have not deemed it necessary to redescribe this species in the present Report.

At the same locality a number of specimens of a smaller species of *Apseudes* were

[1] The full description and figures are to be found in *Abhandl. d. k. Akad. d. Wiss. Berlin*, 1883, p. 15, pl. i. fig. 4.
[2] C. Chilton, Additions to the Isopodan fauna of New Zealand, *Trans. N. Z. Inst.*, vol. xv. (1882), p. 146.

dredged, which undoubtedly differ sufficiently from *Apseudes spectabilis* to constitute the type of a new species, which I propose to call *Apseudes antarctica*.

The largest specimen measures 4 mm. in length.

The cephalothorax is long and wide, nearly as long as the first four segments of the thorax taken together, it is prolonged into a sharp-pointed short rostrum, the eyes are well developed, the ocular lobes taper to a point anteriorly, the pointed extremity being slightly bent outwards; nearly half way along the cephalothorax, but nearer to the anterior than the posterior extremity, is a notch which marks the boundary line between the cephalic and thoracic regions.

The free thoracic segments increase in length but decrease in width up to the fourth; there is, however, less difference between the first three than between the third and fourth; the fourth and fifth segments are subequal in length and breadth; the sixth is rather shorter but not perceptibly narrower than the fifth. In the first free thoracic segments the epimera are prolonged into forwardly directed spiny processes; this is not the case with any of the following segments, where the epimera are small and with rounded margins; in this character *Apseudes antarctica* differs from *Apseudes spectabilis*, where all the epimera are furnished with a spine. In the fourth and fifth segments, which as already mentioned are longer than the preceding segments, there are two lateral projections on either side about equidistant from each other and from the epimera. These segments, it might be mentioned, are wider posteriorly than anteriorly; upon the terminal segment of the thorax one of the lateral spines is present on either side.

The abdomen is distinctly narrower than the thorax; its length is about equal to that of the last three segments of the thorax. The first five segments are subequal; they are furnished laterally with short epimera which terminate in a sharp spiny extremity; the length of these increases in the successive segments.

The caudal shield is a little longer than the free anterior abdominal segments; its shape is rather peculiar, and differs from that of *Apseudes spectabilis* in that it is constricted towards the middle of its extent; the uropoda are articulated to salient processes and the caudal shield terminates in an obtusely pointed extremity.

The *antennules* are a trifle longer than the cephalothorax; the first joint of the peduncle is stout and long, and slightly bent inwards; the second joint is rather more slender and very much shorter, only measuring one-third of the length of the basal joint; the two following joints decrease in length as well as in breadth; the outer flagellum is nearly twice the length of the inner, and is composed of eight joints of irregular size, becoming, however, narrower as they approach the distal extremity; the inner flagellum is composed of three slender elongated joints.

The *antennæ* (fig. 2) are not very much shorter than the antennules but considerably more slender; the first joint of the peduncle is short, the second longer; the exopodite

shows indications of being divided into three joints of which the two distal are very short; the third joint of the peduncle is extremely short, the fourth and fifth elongated and subequal. The flagellum is shorter than the peduncle and consists of six joints.

The *chelipedes* are very stout and strong; the first joint is the stoutest and longer than the two following joints; the third joint is as usual very inconspicuous, the fourth joint is as long as the basal joint of the limb but rather more slender, the chelæ are very powerful; the upper margin of the penultimate joint is furnished with a stout spine; distal to this is a prominent convex area beset with short tubercles from the side of each of which arises a short stiff hair; the distal region of the joint is short and pointed, and overlaps the corresponding extremity of the sixth joint.

The *fossorial limbs* are furnished with a slender short three-jointed exopodite, which is probably also represented in the chelipedes though I did not find it.

The first joint is stouter than the corresponding joint in the following appendages, and longer than any of the succeeding joints; the three following joints are comparatively short and subequal, together equalling in length the basal joint; the distal extremity of the last of these joints has a few stout spines; the penultimate joint of the limb is rather slender and much shorter than the preceding joint; it has four or five stout spines along the inner margin; the distal joint of the appendage is a long curved claw, one-third longer than the penultimate joint.

The remaining thoracic appendages (fig. 3) do not differ materially in structure, but they are in every case more slender than the fossorial limbs.

The abdominal appendages are all present and similar to those of other species.

The *uropoda* are as long as the whole abdomen together with the two last segments of the thorax; that is to say, when measured from the attachment of the appendage to the extremity of the endopodite. The basal joint is stout and extends a little way beyond the end of the caudal shield.

The exopodite consists of six joints, the distal ones being much more elongated than the proximal. The endopodite is of very great length and has twenty or twenty-one joints.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; lat. 48° 45′ S., long. 69° 14′ E.; depth, 127 fathoms; volcanic mud.

Typhlapseudes, F. E. Beddard.

Typhlapseudes, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 115.

Definition.—Body depressed, wider anteriorly, gradually narrowing towards the posterior extremity; head segment broad, about as long as the two following taken

together, produced in front into a short sharp rostrum; ocular lobes minute, triangular, pointed; eyes entirely absent. First free segment of the thorax with minute epimera prolonged anteriorly into a spine; remaining thoracic segments with rounded epimera, extremely minute.

Abdominal segments narrower than thoracic, first five subequal, sixth greatly elongated, terminating in a short conical process.

First pair of antennæ with unequally sized flagella, the outer being the longer; rudimentary exopodite of antennæ short, consisting of a single longish joint, setose at its extremity. Chelæ strong and stout, equally so in both sexes; the second pair of thoracic appendages much stouter than the following, modified into fossorial limbs; both these appendages without the rudimentary exopodite. Abdominal limbs well developed, the exopodite divided into ten joints. Uropoda defective, but apparently elongated and multiarticular, like those of *Apseudes* and the other genera of the family.

Remarks.—This genus, on account of its biflagellate antennules and antennæ furnished with an exopodite, is evidently one of the family Apseudidæ, with which it also agrees in the modification of the second pair of thoracic limbs. It cannot, however, be assigned to any of the three genera which represent that family; from *Apseudes* the present genus differs in having no exopodite to the first two pairs of thoracic appendages; the absence of the rudimentary exopodite in the first two thoracic appendages allies *Typhlapseudes* to *Parapseudes*, from which it differs in that all the abdominal appendages are present, only the first four and the uropoda being developed in *Parapseudes*. The remaining genus *Sphyrapus* cannot be confounded with the present, differing as it does in having no rudimentary exopodite to the antennules, but in having an exopodite developed upon the first pair of thoracic limbs; it agrees, however, with *Typhlapseudes* in having the exopodite of the abdominal limbs biarticulate. Other differences will be apparent from a perusal of the following description of *Typhlapseudes nereus*, the only species at present known.

Typhlapseudes nereus, F. E. Beddard (Pl. XV. fig. 4).

Typhlapseudes nereus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 115.

This species is represented by a number of individuals dredged in the North Atlantic, from a depth of 450 fathoms.

The average length of the species is about 10 mm.

The body is flattened and depressed, smooth, without any covering of hairs even on the abdomen; it is wider anteriorly and gradually narrows to the posterior extremity.

The head and the first segment of the thorax, which are of course fused together

and form a cephalic shield, is flattened in front, but convex laterally and behind. The frontal margin projects as a short sharp rostrum; behind the insertion of the antennary organs is a triangular ocular lobe pointed in front; it has no trace of any optic structures; behind this again is another shorter, triangular, pointed process; more posteriorly the lateral margins of the cephalic shield are convex outwards.

The free thoracic segments diminish gradually in breadth, but increase in length up to the fifth; the sixth is not only narrower but shorter than the fifth. They are all furnished with very minute epimera, those of the first segment are larger and project anteriorly in the form of a short spine. The lateral margins of all but the first two segments are furnished with a short spine very broad at its base, which is situated about half way between the articulation of the limbs and the anterior margin of the segment; in the sixth (and last) segment of the thorax this spine is almost obsolete. In the ventral surface of the thoracic segments is a median spine.

In the female the first four of the free thoracic segments have ovigerous lamellæ.

Of the abdominal segments the first pair are subequal, but diminish gradually in breadth; they are furnished with small epimera, terminating in a pointed extremity and directed backwards.

The terminal segment of the abdomen equals in length any four of the anterior abdominal segments; it is cylindrical in form, becoming gradually wider towards the extremity; it terminates in a truncated straight posterior margin, and in the middle line in a short oval prolongation.

The *antennules* are stouter as well as longer than the antennæ; they are about as long as the cephalothoracic shield and the first segment of the thorax taken together. The basal joint is long and stout, the second joint is very much shorter, the third and fourth shorter still; from the last joint of the peduncle arise the two flagella, of which the outer is longer as well as stouter than the inner; the outer flagellum is made up of ten joints, of which the first is very much the longest; it diminishes gradually in width towards the extremity; the inner flagellum has four or five narrow elongated joints.

The *antennæ* have a five-jointed peduncle and a flagellum about as long as the last two joints. The first joint of the peduncle is short, the second long, with a short, cylindrical, setose exopodite articulated at its extremity; the third joint is very short, the fourth and fifth long and subequal.

I have not a sufficient amount of material at my disposal to give an accurate account of the mouth appendages.

The *chelæ* are not remarkable in any way except for the absence of an exopodite; they appear to be perfectly similar in both sexes, and agree very closely with those of the genus *Sphyrapus* (female), &c. The first joint is very much stouter than any of the succeeding joints; the second is short and narrow and bears a spine on the inner

side just before its articulation with the next joint, which is extremely minute and might easily be overlooked; it is wedged in between the second and third joints, and is only apparent on the inner side of the limb. The fourth joint is longer and stouter and has a number of hairs along the inner margin. The two "fingers" cross at their extremity; they are serrate along the margins which come in contact.

The *fossorial limbs*, which form the second pair, are much longer and stouter than the succeeding abdominal limbs. The first joint is long and curved, the second is very minute, the third and fourth are subequal and rather less than one-half of the length of the basal joint; the first two joints have no spines, the third has a single strong spine on the inner margin, just before it articulates with the succeeding joint, and a tuft of hairs on the corresponding opposite side; the fourth joint has two strong spines on the inner and a single spine on the outer side, besides hairs and more slender spines; the fifth is shorter than either of the preceding, its inner margin is fringed with five stout spines, increasing in length towards the extremity of the joint, and two strong spines besides more slender ones on the outer side; the terminal joint of the limb is elongated and claw-like, toothed along the inner margin. These appendages like the preceding have no exopodite, and they do not differ in the two sexes to any appreciable extent.

The succeeding thoracic appendages are similar to each other and very much more slender than the preceding limbs; the proportionate length of the joints is, however, the same, the second being, as in the fossorial limbs, extremely minute. The spines with which the terminal joints of these limbs are ornamented are also more slender than those of the second pair of thoracic appendages.

The *abdominal appendages*, with the exception of the uropoda, are similar to each other; all the five pairs consist of an elongated basal joint and of two subequal, rather shorter setose rami; the exopodite is divided by a suture into two joints.

The *uropoda* are short and biramose, with an elongated basal joint and two rami, the outer is the shorter.

Station 23, off Sombrero Island, March 15, 1873; lat. 18° 24′ N., long. 63° 28′ W.; depth, 450 fathoms; Pteropod ooze.

Leiopus, F. E. Beddard.

Leiopus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 116.

Body depressed and extremely narrow and elongated, wider anteriorly than posteriorly. Head prolonged in front into a long pointed rostrum; ocular lobes long, triangular, pointed, eyes absent. First free segment of thorax with epimera prolonged anteriorly into a spine, remaining segments with small epimera, which in the last

three are produced into a short spine. Abdominal segments comparatively elongated, first pair subequal; last segment very long and cylindrical, terminating in a rounded median projection. First pair of antennæ with unequally sized flagella, the outer much longer than the inner; second pair of antennæ with a rudimentary exopodite, setose; chelæ extremely slender, with a minute three-jointed exopodite; fossorial limb stout and strong, also with a rudimentary exopodite. Abdominal limbs well developed, with a two-jointed exopodite; uropoda long, with a multiarticulated endopodite and exopodite, the former considerably longer than the latter.

This genus is closely allied to the last, and is as it were an exaggerated likeness of it; the slenderness of the body is more marked in the present genus, the rostrum and the various spines which exist along the sides of the body in the last genus are here much more strongly marked.

The remarkable form of the chelæ and the presence of an exopodite on these and the following pairs of appendages serve, however, to distinguish *Leiopus* from *Typhlapseudes;* the latter character connects *Leiopus* more closely with *Apseudes*, but the extreme slenderness of the chelæ is peculiar to the genus.

As in *Typhlapseudes* there appears to be no great distinction in *Leiopus* between the males and females.

Leiopus leptodactylus, F. E. Beddard (Pl. XV. figs. 5–12; Pl. XII. fig. 1).

Leiopus leptodactylus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 116.

This species is represented by a large number of individuals, dredged in the North Atlantic from a depth of 1000 fathoms.

The largest specimens attain a length of 13 mm.

The body is flattened, depressed, extremely elongated and narrow, it is wider anteriorly and gradually diminishes posteriorly.

The cephalothorax, comprising the head and the first segment of the thorax, is rather more than twice the length and about equal in breadth to the first free segment of the thorax. The head is prolonged in front into a long rostrum; laterally are the two ocular lobes which are large and conspicuous and pointed anteriorly; there is no trace of any eyes. Behind the ocular lobes are two longish spiny processes which represent the epimera of the first thoracic segment; they, as well as the ocular lobes and the rostrum are much more developed than in the last species. The dorsal surface of the head is convex anteriorly as well as posteriorly by reason of the paired postero-lateral convexities.

The first segment of the thorax is as wide as the head, the following segments decrease in width, the first of them suddenly, the rest more gradually; the length of these segments increases up to the fourth, the fifth being subequal in length to the fourth, and the sixth rather shorter.

The first free segment has well-developed epimera, prolonged anteriorly into a spine; the three last segments of the thorax have also epimera, which are prolonged into a short spine; in these segments, however, the spine is directed backwards instead of forwards as in the first segment; the intermediate segments have short epimera without any spines; upon all the free thoracic segments, with the exception of the first, are a pair of longish lateral spines, situated between the articulation of the limbs and the anterior margin of the segment. These have been also described as existing in some of the segments, at least, of *Typhlapseudes*, but in the present species they are present upon all and very much longer.

The length of the abdomen is rather less than one-half of the length of the entire body; the first five segments are subequal in length and do not appear to decrease in breadth, or, if they do so, it is imperceptibly; the postero-lateral regions are more prolonged outwards than in the last species, and the spines overlying the articulation of the limbs are better developed than in *Typhlapseudes*. The terminal segment of the abdomen is longer than the last three taken together; it is cylindrical in form, with straight lateral margins; it is somewhat widened out posteriorly.

On the ventral surface of all the thoracic and abdominal segments, with the exception of the last, is a median spine situated rather nearer to the anterior than to the posterior margin of the segment. I have already referred to the presence of a similar series of spines in *Typhlapseudes*, but in that genus they are almost confined to the thoracic segments, being extremely minute upon the abdomen.

The *antennules* are rather long, measuring about as much as the cephalothorax and first two free thoracic segments taken together.

The first joint of the peduncle is the longest and stoutest, it is slightly curved like an S; the three remaining joints of the peduncle decrease gradually in size; there are two flagella, of which the inner is very much shorter, as well as more slender than the outer flagellum; it consists of about six elongated joints. The outer flagellum is longer than the peduncle; it is made up of very numerous joints—I counted twenty-seven in one specimen—which are longer but more slender distally.

The *antennæ* (Pl. XV. fig. 6) are hardly so long as the first joint of the peduncle of the antennules. The peduncle is about equal in length to the flagellum; the first joint is short and stout and has a longish projection on the inner side; the second joint is much more slender but longer; on the outer side it is prolonged beyond the articulation of the succeeding joint, and on this prolongation is placed the movable exopodite, which is distinctly three-jointed, the basal joint being much longer than the two distal joints; the third joint of the peduncle is extremely short, the two following joints are long and subequal; the flagellum is composed of about four slender joints.

The *mandibles*.—One of these appendages is shown in fig. 1 of Pl. XII.; the extremity is divided into two slightly divergent processes which are of a dark brown colour, and

consist of several closely approximated conical tooth-like processes; just below this is a lobe which bears at its extremity a tuft of strong though rather slender spines which are in every case bifid at their extremity; the molar process projects downwards nearly at right angles with the rest of the appendage; it terminates in a blunt cutting edge which is finely grooved on one side.

The palp arises just above the point at which the molar process joins the body of the appendage; it is three-jointed, the middle joint being the longest; the terminal joint is crescentic in outline; from the straight lower margin are given off a series of hairs which are shorter towards the articulation of the joint; the hairs at the apex of the joint are very long; the second joint is fringed with a row of moderately long hairs for the distal one-third.

The *first pair of maxillæ* (Pl. XV. fig. 7) have, as appears to be invariably the case in the Isopoda, two well-developed masticatory lobes, of which the anterior is considerably the larger; the extremity of this is fringed with a row of stiff stout hairs, above which is a long, soft, spine-like process which may serve the function of a tasting organ; above this again and fringing the upper margin of the joint are a few short slender hairs; the lower lobe is oval in form, the distal margin being fringed with a few stiff hairs; the palp of this appendage is, as in other Apseudidæ, well developed and three-jointed; the proximal and distal joints are subequal and much longer than the very short median joint; three or four long, slender, simple hairs spring from the apex of the terminal joint.

The *second pair of maxillæ* (fig. 8) are faintly divided at their extremity into three lobes, of which the upper is again subdivided into two; this lobe lies on a different plane from the others; on the outer margin are two long hairs; the masticatory edge is furnished with similar but shorter hairs; the middle lobe is fringed with stout spines similar to those upon the masticatory edge of the mandible. The third and lowest lobe, which does not project nearly so far forwards as the others, is fringed with a dense array of stout, simple, straight spines, between which are a number of short slender hairs.

The *maxillipedes* (fig. 9) do not present any features of particular interest. The palp is long and four-jointed, the second joint being very considerably the largest. As in other Apseudidæ this appendage has an exopodite, which, however, I am not able to figure, as it was destroyed in teasing out the mouth appendages; its distal joint is oval and fringed with fine hairs; the second joint is stout but smooth. I presume that there is a third basal joint, but I am not able to describe it.

The *chelipedes* (fig. 10) are rather remarkable in form, and appear to be similar in both sexes; I could not, at any rate, detect any marked difference in the form of these organs in eight individuals, which probably include representatives of both sexes.

The chelipedes, and also the following pair of appendages, viz., the fossorial limbs, are furnished with a minute three-jointed setose exopodite. The hand of the chelipedes is extremely elongated and slender, and the other joints share in this slenderness, which gives these appendages a very unusual form, inasmuch as they are generally extremely

stout in the Apseudidæ, as well as in the Tanaidæ. The basal joint of the limb is rather the stoutest, and furnished on the outer side with a sharp spiny process placed at the commencement of the distal third of the joint; the second joint is extremely minute, the third about half the length of the basal joint, and articulated with the succeeding joint by a very oblique suture; the following joint is the longest of the whole limb, and is furnished along the inner margin with sparsely-set, long, slender hairs; the fingers of the hand are long and slender, and parallel to each other, both being curved downwards instead of crossing each other at the tip as is more usual.

The *fossorial limbs* (fig. 11) are stout and strong, very much more so than any of the succeeding appendages. The distal joint is the longest as well as the stoutest, and is curved in an S-shape; at the distal extremity on the inner side is a spiny process similar to that of the chelipedes, not an articulated spine like those which are developed along the distal joints of the limbs; close to the articulation of the joint with the body are two similar backwardly directed spiny outgrowths; in front of these arises the exopodite. The second joint of the limb is extremely small, though not so inconspicuous as in the chelipedes. The third joint is nearly as long as the first but more slender; at its distal extremity are a row of stout hairs; the two following joints are short, subequal and compressed; the inner margin of both is furnished with a row of eight or nine stout spines set in indentations of the margin of the joint; on the opposite side are a number of more slender spines similar to those upon the third joint. The distal joint of the limb is a stout curved spine. The five succeeding pairs of appendages are similar to each other, and are much more slender than the fossorial limbs. The first joint is the longest, it is curved in a somewhat S-shaped fashion, and is slightly but not markedly stouter than the succeeding joints; the second joint is extremely small, the three following joints are subequal, each rather more than one-third of the length of the basal joint; the inner margin of these joints is fringed with a row of slender spines; the distal joint of the limb is an elongated slender claw.

These appendages differ principally from the fossorial limb in the equality of the third, fourth and fifth joints, and in the length of the terminal claw; also, of course, in the slenderness and delicacy of the whole limb, as well as of the spines with which they are armed.

The *abdominal appendages* (fig. 12) are similar to those of the last species, the first five pairs are similar; the exopodite is rather narrower than the endopodite, and is distinctly two-jointed. The basal joint of the limb is longer as well as stouter than either of the rami.

The *uropoda* were incomplete in every specimen; enough was left, however, to show that they agree with those of the genus *Apseudes* in being extremely long and multi-articulate; the endopodite has many more joints than the exopodite.

Station 78, off the Azores, July 10, 1873; lat. 37° 26′ N., long. 25° 13′ W.; depth, 1000 fathoms; volcanic mud.

Family TANAIDÆ.

Tanais, Milne-Edwards.

Tanais, Milne-Edwards, Résumé d. Ent., p. 182, 1829.
Anisocheirus, Westwood, Ann. d. Sci. Nat., t. xxvii., 1832.
Zeuxo, Templeton, Trans. Entom. Soc. Lond., vol. i. p. 203, 1836.
Crossurus, H. Rathke, Nova Acta Acad. Cæs. Leop.-Carol. Nat. Cur., vol. xx. p. 35, 1843.

Two different species were obtained by the Challenger that are referable to the genus *Tanais*, as redefined by Sars; one of these was noticed by the late Dr. v. Willemoes-Suhm for the peculiarity that the eggs are carried by the female in two sacs attached to the bases of the last thoracic limbs, much after the fashion of a Copepod; the ovigerous lamellæ of the anterior thoracic segments remain undeveloped. This particular species has been lately described by Dr. Studer and named *Tanais willemoesii*. A second species of the genus was dredged, also in shallow water, off Prince Edward Island.

Tanais willemoesii, Studer.

Tanais sp., Suhm, Proc. Roy. Soc. Lond., vol. xxiv. p. 590.
Tanais willemoesii, Studer, Isopoden gesammelt, etc., Abhandl. d. k. Akad. d. Wiss. Berlin, 1883, p. 24 (of Memoir).

A very large number of specimens of this species were dredged off Kerguelen Island in shallow water; as, however, the species has been recently carefully described by Studer, it is hardly worth while to recapitulate his description here. This is the species to which the late Dr. v. Willemoes-Suhm referred in his Preliminary Report in the following words :—

"A *Tanais* having a length of about 17 millims. is very common, and though not deviating by any means from the typical species of the genus, it has a peculiarity connected with its propagation; for the females, instead of having breeding-lamellæ, as the other species of the genus have, carry their eggs, like Copepods, in small cutaneous sacs attached to the genital opening at the base of the fifth pair of pereiopods. These sacs extend as the development goes on, and attain a diameter of 3–4 millims. Professor Wyville Thomson having discovered among the echinoderms of Kerguelen Land many forms which do not undergo any metamorphosis, but develop in pouches of their parents, this peculiarity in *Tanais* deserves to be noted, not exactly as comparable to those facts, but as an anomaly in the group to which the animal belongs."

Among the individuals collected by the Challenger there were a large number of females, some with fully developed egg-bags filled with eggs, and others in which these structures were still rudimentary; in no case, however, were there any observable traces of ovigerous lamellæ on any segments other than the fourth.

Station 149K, off Christmas Harbour, Kerguelen, January 29, 1874; lat. 48° 40′ S., long. 69° 6′ E.; depth, 45 fathoms; volcanic mud.

Tanais hirsutus, F. E. Beddard (Pl. XVI. fig. 9).

Tanais hirsutus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 116.

This species is represented by a considerable number of specimens dredged off Prince Edward Island, in 50 to 150 fathoms.

The length of the largest specimen is about 9 mm.

The body is elongated, the anterior region is wide, the posterior thoracic segments narrower; the last thoracic segment and the first three abdominal segments are again wider, after which the body narrows towards the termination.

The head and first segment of the thorax form a quadrangularly shaped piece; the anterior margin is notched on either side of the short obtuse rostrum for the articulation of the antennæ; external to the articulation of the latter are the ocular lobes, which are somewhat projecting and rounded; eyes are present and well developed; the antero-lateral angle of the cephalothorax is formed by a rounded projection to the outside of the ocular lobes; behind this the lateral margins of the cephalothorax are almost straight, only slightly divergent, the posterior region of the head being wider posteriorly than anteriorly; the dorsal surface of the cephalothorax is convex and swollen. The two first free segments of the thorax are short and subequal, and about as wide as the cephalothorax; the third segment is narrower but longer, about as long as the first two taken together; the two following segments increase progressively in length; the first of these is about twice the length of the preceding segment, their diameter is a trifle less than that of the preceding segment The last thoracic segment is wider than the preceding but a little shorter; the first three segments of the abdomen are wider as well as longer than the following; they are subequal to each other in length and only a little shorter than the last segment of the thorax; the first abdominal segment is rather wider than the last segment of the thorax, the second wider still, the third shorter again; the two following segments are very short as well as narrow; the terminal segment of the body ends in a blunt rounded extremity.

The *first pair of antennæ* consist of three principal joints; the basal joint is the longest and stoutest, the second is shorter and more slender; the third joint is longer than the second but more slender; the palp is represented by two or three minute joints; the distal extremities of the joints of the peduncle are surrounded by a dense circle of fine hairs, plumose, and of great length.

The *second pair of antennæ* resemble the first almost entirely in structure but are rather shorter; the rudimentary flagellum appears to be absent; they are densely beset with fine hairs. The cutting edge of the *mandibles* is furnished with two teeth, the molar processes are strongly developed and stouter than the extremity of the mandible; the palp is absent.

The *chelæ* are stout and strong; the next three thoracic limbs are subsimilar, and

considerably more slender than the three posterior pairs, which are stout. This difference between the anterior and posterior thoracic appendages is extremely well marked.

As is usual in the genus *Tanais* the fourth and fifth appendages of the abdomen are aborted; the three first pairs are well developed; they consist of a triangular basal joint, and two rami which are broad and crescentic in form and fringed with numerous long hairs.

The *uropoda* are of unusual length; they are longer than the abdomen; each consists of about twelve joints, the basal joint being much the longest and stoutest; the distal joints gradually decrease in diameter but increase slightly in length.

This species appears to be a true *Tanais* by reason of the abortive fourth and fifth pairs of abdominal appendages; it differs, however, from the typical species in the specialization, as regards size, of the thoracic limbs, and in the great length of the uropoda; this last character is found in *Tanais willemoesii* though hardly to so marked a degree.

Off Prince Edward Island; depth, 50 to 150 fathoms.

Typhlotanais, G. O. Sars.

Typhlotanais, G. O. Sars, Revision, &c., Archiv f. Math. og Nat., vol. vii. p. 33.

This genus comes nearest to *Paratanais*, and is chiefly to be distinguished from it by the complete absence of eyes.

It contains a large number of species, most of which have been at present but briefly described. I am not, therefore, perfectly satisfied as to the distinctness of the two following species, which I describe as new with a certain reservation.

The occurrence of the genus at Kerguelen is interesting, as it has hitherto been only known from the North Sea and the Mediterranean. The depth at which *Typhlotanais brachyurus* (see p. 123) was dredged far exceeds the range of the genus as hitherto known.

Typhlotanais kerguelenensis, F. E. Beddard (Pl. XVI. figs. 1–3).

Typhlotanais kerguelenensis, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 117.

The individuals of this species measure up to 3 mm. in length.

The cephalothorax is short and wide; it is prolonged between the antennæ into a short pointed triangular process; on either side of the cephalothorax, external to the articulation of the antennules, the cephalothorax ends in an acutely pointed process, which is, however, not segmented off and shows no trace of any ocular structures.

The first segment of the thorax is rather shorter than the rest, which are subequal, diminishing slightly towards the posterior end of the body; the lateral margins of those

segments are nearly straight. The first segment of the thorax has a compressed, forwardly directed, curved spine which arises from the middle of the ventral surface of the segments; there is a trace of a similar process on the second segment, which is, however, merely a slight elevation and not a spiny process; the point at which the thoracic limbs articulate varies in the successive segments; in the first they arise from a point close to its anterior border; in the second they arise a little further back, and in the third at about the middle; the three posterior thoracic appendages arise close to the posterior boundary of their respective segments.

The abdomen is about as long as the two last segments of the thorax taken together.

The first five segments are short and subequal; the terminal segment is longer and ends in an obtusely pointed extremity.

The *antennules* (fig. 2) are about as long as the cephalothorax; they have the normal structure, the first joint being the longest and stoutest; the second joint is very short, the third longer.

The *antennæ* are shorter than the antennules as well as more slender; the two basal joints are short and subequal, the third joint is long and curved from above downwards; the flagellum consists of two, one, the distal joint, being very rudimentary.

The *chelipedes* are chiefly remarkable for the slenderness of the hand; one of these appendages is shown in fig. 3, where this peculiarity is rendered apparent.

Of the *ambulatory limbs* the first pair are rather longer than the two following pairs; the three anterior pairs of thoracic appendages differ from the three posterior pairs in being much more slender.

The *uropoda* are biramose; the basal joint is short and stout; the outer of the two rami is more slender than the inner, and consists of only one joint, which is furnished at the free extremity with a single long seta; the inner joint is stouter than the outer, and is distinctly biarticulate; the distal joint, which is shorter than the proximal, bears a tuft of hairs at its extremity. In another specimen both branches of the uropoda are distinctly biarticulate.

A single specimen of a species of *Typhlotanais* was dredged in the North Pacific from a depth of 2050 fathoms in company with the next species *Typhlotanais brachyurus*; the specimen was mounted on a slide in Canada balsam during the Expedition. I find it impossible to distinguish this individual from those dredged at Kerguelen by any very distinctly marked characters; at the same time the condition of the specimen does not enable me to speak with great certainty, which is all the more to be regretted, as the occurrence of the same species in very deep and in shallow water is a rare occurrence.

Station 246, Mid North Pacific, July 2, 1875; lat. 36° 10′ N., long. 178° 0′ E.; depth, 2050 fathoms; bottom temperature, 35°·1 F.; Globigerina ooze.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; lat. 48° 45′ S., long. 69° 14′ E.; depth, 127 fathoms; volcanic mud.

Typhlotanais brachyurus, F. E. Beddard (Pl. XVI. fig. 7).

Typhlotanais brachyurus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 117.

From the same station which yielded *Bathytanais bathybrotes* (a species presently to be described) three specimens of a Tanaid were dredged, which evidently belong to a different species, by reason of the elongated body and the complete absence of eyes. This species appears in fact to belong to the genus *Typhlotanais*.

The length of the largest specimen is 8 mm.

The cephalothorax is hardly longer than the first free thoracic segments; it is produced between the eyes into a short pointed rostrum; the ocular lobes are entirely absent.

The segments of the thorax are greatly elongated and narrow; the first segment is one-third less than either of the two following, which are equal; the fourth segment is hardly shorter than the third; the fifth and sixth segments decrease regularly in length, the fifth being about as long as the first.

In a second specimen the proportional length of the several segments was as nearly as possible the same. The first pair of appendages are attached close to the anterior extremity of its segment; the second and third pairs move progressively a little further back, but the difference in position is very slight, and is only just recognisable; the third pair are attached near the middle of the segment as is the case with other species. The three posterior pairs of appendages are attached close to the posterior margin of their segment. There is no ventral spine on the first free segment.

The abdomen is short, not so long as the last two segments of the thorax taken together; the five anterior segments are subequal; the sixth is as long as the last three.

The *antennules* are rather shorter than the cephalothorax; in all the three specimens they present characters which are usually confined to the females in this and allied genera; that is to say, they consist of three joints, of which the basal is the stoutest; the second joint is considerably shorter than the third.

The *antennæ* are a little shorter and more slender, and likewise consist of three joints, of which the middle one is the longest.

The *chelipedes* are short and stout; the distal extremity of the penultimate joint is furnished with three or four blunt tubercles just before its termination in a sharp point which overlies the extremity of the sixth joint.

Of the remaining thoracic appendages the three anterior are more slender than the three posterior; in the latter the basal joint is extremely large and swollen.

All the abdominal appendages are present.

The *uropoda* are biramose, the exopodite being rather shorter than the endopodite; the latter is two-jointed; the exopodite consists only of a single joint.

Station 246, Mid North Pacific, July 2, 1875; lat. 36° 10′ N., long. 178° 0′ E.; depth, 2050 fathoms; bottom temperature, 35°·1 F.; Globigerina ooze.

Neotanais, F. E. Beddard.

Neotanais, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 117.

Definition.—Body elongated and narrow, everywhere of approximately the same diameter. Cephalothorax slightly projecting between the antennæ; ocular lobes present but extremely minute, oval, pointed anteriorly. First pair of antennæ (in the male) with a three-jointed peduncle and a flagellum of four joints. Second pair of antennæ more slender but of equal length, with a five-jointed peduncle and a short four-jointed flagellum. Mandibles with the usual structure, with a slender extremity and a stout molar process. Chelæ very stout, the distal section of the penultimate joint extremely broad with a toothed margin anteriorly terminating in the usual slender hooked extremity; last joint much more slender than the corresponding portion of the fifth joint. Succeeding thoracic appendages similar to each other, the first only somewhat more slender and shorter than the rest. Abdominal appendages all present. Uropoda extremely long, with an eight-jointed endopodite and a small two-jointed exopodite.

Remarks.—I have thought it necessary to institute a new genus for two small Tanaids, one dredged in the Atlantic off the coast of South America, in 1900 fathoms, the other also in the Atlantic but further to the north, and in 1252 fathoms. This genus comes nearest to *Heterotanais*, Sars, but differs in the great length of the endopodite of the uropoda and in the fact that the chelæ are fully developed and of the normal structure in the male; as in *Heterotanais* the exopodite of the uropoda is distinctly two-jointed, and this character distinguishes both genera from *Leptochelia*, Dana, as also do the form of the chelæ in the male. A well-marked characteristic of this genus is the specialisation of the thoracic appendages into an anterior and posterior series; in the three anterior thoracic appendages the distal joint is a simple, elongated, somewhat curved claw; in the posterior appendages this terminal joint is furnished at its extremity with a circlet of stout spines and a long, mesially placed, slender hair.

Neotanais americanus, F. E. Beddard (Pl. XVI. figs. 4–6).

Neotanais americanus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 118.

The present species is the only representative of this new genus; the specific as well as the generic characters depend upon the examination of two male specimens, each of which measures about 6 mm. in length.

The body is depressed and elongated, everywhere of approximately the same diameter. It is smooth both dorsally and ventrally, with no hairs or spines.

The cephalothorax is pear-shaped, narrower anteriorly and wider posteriorly; it is about as long as the first two segments of the thorax taken together; the anterior margin

terminates in the middle line in a very short, blunt rostrum; on either side of the shallow excavations which lodge the basal joints of the antennules are the minute but separate ocular lobes; these are rounded, oval in front, the anterior end being pointed and prolonged; there was no trace of any ocular structures. The first free thoracic segment is shorter, rather more than half the length of the four succeeding segments, which are subequal; the last thoracic segment is shorter than the foregoing; each of these segments is rather narrower anteriorly where it articulates with the segment in front; the general shape of the segment is short, oblong, with rounded angles; this does not apply to the first or to the last free segment of the thorax, which are broader than they are long.

The five anterior segments of the abdomen are equal in length and in diameter, only the first one being a trifle longer than the rest.

The terminal segment of the abdomen is longer and wider than the rest; it has a pair of lateral projections with which the uropoda articulate; posteriorly it is rounded and a minute median triangular process projects from the extremity; on either side of this the posterior margin of the abdomen is slightly concave.

The *antennules* (fig. 5) are considerably stouter than the antennæ; the peduncle has three joints, of which the proximal one is much the longest and stoutest; it is furnished with a tuft (three or four) of slender spines on the outer side, near to its articulation with the second joint; the second joint is about one-fourth of the length of the first, and like it has a tuft of slender spines occupying a similar position to those of the basal joint, and one slender hair-like spine upon the opposite side; the third joint of the peduncle is stouter again, with one or two short slender spines upon the inner as well as the outer margin, just before its articulation with the flagellum; the latter consists of four joints, of which the first is very much the longest, as well as broader than the succeeding joints; each of the three distal joints is furnished with a single olfactory hair.

The *antennæ* (fig. 6) are considerably more slender and shorter than the antennules; the peduncle consists of five joints; the basal joint is short and oval, much stouter than any of the succeeding joints, which are of equal thickness; the second joint is moderately long, the third stouter, the fourth and fifth subequal to each other and to the second joint; the flagellum has four joints, which decrease gradually in diameter, the first being the widest; the first joint of the flagellum is also the longest, the two middle ones are shorter and subequal, the fourth shorter still, and provided at its extremity with a tuft of fine hairs.

As the only specimen was mounted on a slide in Canada balsam it is impossible to describe, in a detailed manner, the mouth appendages, which do not appear, so far as could be seen, to present any marked differences from those of other species.

The *chelæ* are short and very stout; the second joint is particularly stout as compared with the others; the third joint as usual is very small, a portion of the fourth coming to articulate directly with the second; in the fifth joint the palm is

straight for the first half, the margin being fringed with fine, closely-set denticles; the distal half is furnished with blunt tooth-like processes, and is bent downwards at an oblique angle; it terminates in a short pointed extremity which is bent upwards; towards the distal extremity are a few slender hairs scattered here and there; the finger gradually narrows towards its termination in a curved pointed extremity; the inner margin is provided with a number of low tooth-like processes, each terminating in a sharp point which is directed forwards.

The remaining thoracic limbs are more or less similar to each other; there is no difference in size between the anterior and posterior series, but a slight difference in structure; the proximal joint is very long, the second extremely short; the third is about half the length of the proximal joint, the fourth and fifth are rather shorter and subequal; the terminal joint of the limb has the form of a long slender spine; the inner margin of the penultimate joint has a row of stout spines, of which the distal one or two are serrate, on the opposite side of the joint are a number of more slender, hair-like spines; the antipenultimate joint has a similar structure, but the spines are not so strong; the distal joints are nearly smooth, having only a very few slender hairs developed at the point of articulation with the succeeding joints. The above description applies to the first three pairs of ambulatory limbs. The fourth, fifth, and sixth pairs of thoracic appendages differ slightly in their structure from the anterior pairs; this difference mainly concerns the terminal joint of the limb, which is considerably more elongated than in the anterior appendages; it terminates in a fringe of short spines and mesially in a long slender spine which is of about half the length of the joint.

On the abdomen all the appendages are present, but they present no special features of interest, with the exception of the uropoda, which have a typical structure.

The basal joint of the uropoda is very stout and long, and with it articulates the minute two-jointed exopodite, as well as the long slender endopodite which is made up of eight separate joints, all of which have tufts of hairs near to their articulation with the succeeding joints. Both the endopodite and the exopodite end in a tuft of slender hairs; the length of the uropoda is nearly equal to that of the abdomen.

Another example of this species was dredged in the North Atlantic from a depth of 1250 fathoms; it presents certain slight differences from the above described species; these differences have reference to the proportionate length of the thoracic segments; seeing, however, that the two specimens come from widely distant localities, it appears to be unnecessary to found a specific distinction between the two individuals, at least for the present. The present specimen is stouter and more robust than the last, but of equal length; the cephalothorax is nearly as long as the first three segments of the thorax taken together, the thoracic segments gradually increase in length up to the fourth; the fifth and sixth segments are subequal and about as long as the third.

The following table will illustrate the varying proportions in the length of the segments in the two individuals :—

	Cephalothorax.	Th. 1.	Th. 2.	Th. 3.	Th. 4.	Th. 5.	Th. 6.
Individual from Station 323, . . .	34	10	20	20	21	21	14
Individual from Station 45, . .	45	12	16	19	23	19	19

Station 45, S.E. of New York, May 3, 1873; lat. 38° 34′ N., long. 72° 10′ W.; depth, 1240 fathoms; bottom temperature, 37°·2 F.; blue mud.

Station 323, off the River Plate, February 28, 1876; lat. 35° 39′ S., long. 50° 47′ W.; depth, 1900 fathoms; bottom temperature, 33°·1 F.; bottom, blue mud.

Leptognathia, G. O. Sars.

Leptognathia, G. O. Sars, Revision, &c., Archiv f. Math. og Nat., vol. vii. p. 40.

In his revision of this group of Isopods Professor Sars has included several new species, as well as certain other species described by Lilljeborg and others under the genera *Tanais*, *Paratanais* and *Leptochelia*, within a new genus which differs from any of the above named in the following particulars.

The eyes are absent. The mandibles are extremely feeble in structure, whence the name *Leptognathia*, and the antennæ are four-jointed in the female; in the latter character *Leptognathia* approaches *Cryptocope*, *Haplocope*, *Strongylura* and *Anarthrura;* it differs from any of these, however, in the fact that the abdominal appendages are present and well developed in the female; in the above mentioned genera these appendages are either absent or very feebly developed in the female sex.

A single specimen, which I refer without hesitation to this genus, was obtained during the Challenger Expedition off the shores of Kerguelen, in comparatively shallow water (120 fathoms), thus extending the range of the genus (hitherto only known from the North Sea, Mediterranean, and Atlantic shores of America) into the Southern Hemisphere.

Leptognathia australis, n. sp. (Pl. XVI. fig. 8).

This species is probably new, but agrees very closely with *Leptognathia longiremis*, which has been recently fully described by Professor Sars in his account of the Crustaceans collected during the Norwegian North Sea Expedition (p. 78). As far as I can make out from a comparison of his description and figures with the single specimen

dredged by the Challenger, the main difference between the two species is in the greater elongation of the middle thoracic segments of *Leptognathia australis*, and in the absence of serrations on the distal joints of the chelipedes. These differences, as well as others which will be referred to in the course of the following description, seem to me to be sufficient to distinguish the species.

Leptognathia australis as already mentioned is represented in the Challenger collection by a single specimen, an ovigerous female; it measures about 4 mm. in extreme length.

The body is extremely narrow and elongated, the proportions between the cephalothorax, thorax, and abdomen are as follows:—Cephalothorax 6, thorax 19, abdomen 8; the proportions of *Leptognathia longiremis*, measured from Sars's figure (pl. vii. fig. 18), are 5, 16, 8; it is evident, therefore, that in *Leptognathia australis* the thoracic region comprising the free thoracic segments is proportionately longer than in the other species.

The cephalothorax is longer than the first free segment of the thorax, but not as long as the first two segments taken together; as the single specimen was mounted on a slide so as to be seen from the side, I am unable to describe the shape of the cephalothorax; eyes are, however, completely absent.

The first segment of the thorax is shorter than any of the following three, which are subequal and about half again as long as the first segment; the fifth segment is shorter than the fourth, but a little longer than the first; the last segment of the thorax is shorter than any of the others, with the exception of the first, which it equals in length. The thoracic segments are separated from each other by well-marked constrictions.

The point of insertion of the ambulatory appendages appears to be characteristic in many Tanaids; in the present species the first pair are articulated close to the anterior extremity of their segment; the second, third, and fourth pairs at about the middle of their respective segments; the two last pairs are articulated a very little nearer to the posterior margin of their segments, the last a little more than the first, but still roughly in the middle of the segment, not definitely at its posterior extremity as in *Typhlotanais kerguelenensis*. The ovigerous lamellæ are developed along the thorax as in other species.

The *abdomen* is altogether about as long as the two last segments of the thorax and one-half the fourth segment; the terminal segment is rather longer than the two preceding, and ends in an obtuse rounded extremity.

The *antennules* are not so long as the cephalo-thoracic shield, they are four-jointed, the joints decreasing progressively in width as well as in length.

The *antennæ* are of about the same length as the antennules; this structure is entirely similar to that of the same appendage in *Paratanais*.

The *chelipedes* are stout and robust in structure; the first joint is the longest, with

the exception of the fourth, which is subequal to it; the second joint is extremely short, the fingers of the hand are stout and not greatly elongated, their extremities cross.

The *ambulatory limbs* appeared to me to fall into two distinct series as in *Paratanais*, the anterior three pairs being more slender than the posterior; also the posterior appendages are rather more spiny than the anterior, as is stated by Sars to be the case in *Leptognathia* generally.

The *abdominal appendages* are quite normal in structure and are all fully developed.

The *uropoda* are about twice the length of the terminal segment of the abdomen; they are biramose, both rami being biarticulate; the outer branch is two-jointed but very slender, not being longer than the basal joint of the limb, its extremity is furnished with a single long hair; the inner branch is quite three times as long as the outer, as well as being considerably thicker, the proximal joint is rather stouter as well as longer than the distal.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; lat. 48° 45′ S., long. 69° 14′ E.; depth, 127 fathoms; volcanic mud.

Paratanais, Dana.

Paratanais, Dana, U.S. Expl. Exped., Crust., vol. ii. p. 779.

This genus differs from *Tanais* in the following particulars: (1) in the antennules which differ in the two sexes, being better developed in the males than in the females; (2) in the greater size of the three posterior thoracic appendages as compared with the three anterior; (3) in the full development of all the abdominal limbs; (4) in the short biramose uropoda, each ramus being two-jointed.

In his Revision of the Tanaids[1] Sars only allows two species, one of which (*Paratanais forcipatus*, Spence Bate and Westwood) is a European form, while *Paratanais elongatus*, Dana, is a native of the Sooloo Islands.

During the voyage of the Challenger a considerable number of small Tanaids which appear to me to belong to this genus, were dredged at Kerguelen, in shallow water. They agree with it in every particular except in the extremely marked sexual dimorphism; not merely are the antennæ different in the two sexes but the chelæ are extraordinarily divergent in structure. This great discrepancy makes me hesitate before including all the individuals in the same species; the reasons, however, which appear to me to necessitate this step are, firstly, that the chelæ do frequently exhibit sexual differences in this as well as in other genera; and, secondly, that all the individuals with peculiarly modified chelæ are, judging from the antennules, males, while those specimens with chelæ of the normal form are invariably females. I believe, therefore, that I am right in simply regarding this species as exhibiting in a very marked degree a dimorphism in the form of the chelæ.

[1] *Archiv f. Math. og Nat.*, Bd. vii. (1882), p. 32.

Paratanais dimorphus, F. E. Beddard (Pl. XVII. figs. 1–8).

Paratanais dimorphus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 119.

A very large number of a small species of Tanaid were dredged off Christmas Harbour, Kerguelen, which appear to me to belong to the genus *Paratanais*. Some of these individuals presented the ordinary characters of the genus, but others were found to differ in the elongation of the cephalothorax, and in the peculiar structure of the chelipedes, which will be described more minutely immediately; these latter specimens, however, judging from the greater development of the antennules, are males, while the specimens with normal chelipedes appear to be as invariably females. For this reason, and because the two series of individuals were of about the same size, and were obtained at exactly the same locality, I am inclined to suppose that they are merely the males and females of the same species, which is thus characterised by a marked sexual dimorphism. I am bound to state, however, that the only mark of sex which was discoverable in these specimens is the varying structure of the antennules;[1] but this is perhaps sufficient in the absence of other data to determine the sex with certainty; and if these individuals are not respectively the males and females of the same species, it is at least a very remarkable coincidence, that of one species only males should have been obtained, and of the other only females.

Description of the Female.—The female (fig. 2) presents no very remarkable characters, and it would indeed be hard to define the species, if it were not for the male which is so extraordinarily different.

The female specimens measure about 3 mm. in length.

The cephalothorax projects very slightly between the bases of the antennules, the eyes are large and oval, and have the normal position and structure; the length of the cephalothorax is greater than that of the three following free segments of the thorax.

The first free segment of the thorax is very short, the second about half as long again; the third and fourth continue to increase progressively in length; the fifth segment is very slightly longer, and the sixth decidedly shorter than the fourth.

The abdomen is rather longer than the last two segments of the thorax, the segments of which it is made up are equal, with the exception of the terminal segment, which is longer than the rest.

The *antennules* are shorter than the cephalothorax; the first joint is the longest, the second and third are very much shorter and subequal, the terminal joint being if anything shorter than the preceding.

The *antennæ* are a trifle shorter than the antennules, and are five-jointed, the three

[1] In several, but not in all, instances ovigerous lamellæ were present in the specimens which, on account of the antennæ, would be regarded as females. Similarly, in certain of the supposed males, I could plainly see the paired genital apertures on the last segment of the thorax.

basal joints are short and subequal; the fourth joint is much longer, rather longer than any two of the preceding, and curved; the distal joint is short.

The *chelipedes* are stout and have the usual structure.

Of the *thoracic appendages* the three posterior differ from the three anterior in having the basal joint stout and swollen; the three anterior pairs of ambulatory limbs are slender.

All the *abdominal appendages* are present, and well developed.

The *uropoda* are biramose, each branch consisting of two joints; the outer branch is more slender than the inner.

Description of the Male.—The male specimens (fig. 1) are of about the same length as the female.

The cephalothorax is long and rather narrow, and is prolonged into a slight obtuse process at its anterior extremity. The cephalothorax equals in length the first three segments and half of the fourth segment. The eyes are large and oval.

The first free segment of the thorax is the shortest; the second segment is nearly twice the length of the first; the third is half again as long as the second, the fourth and fifth are subequal, and about half again as long as the third; the last segment of the thorax is shorter than the fourth and fifth, and about as long as the third; the lateral margins of the segments are rounded, and the transverse diameter is greatest in the middle and diminishes anteriorly and posteriorly, so that the segments are separated by a well-marked constriction, the first free segment is separated from the cephalothorax by a conspicuous notch, but it is not narrower anteriorly; the last thoracic segment is closely applied to the first abdominal segment, and is narrower anteriorly, but gradually increases in width posteriorly.

The abdomen equals in length the last two thoracic segments; the first five segments are subequal in length and diminish imperceptibly in width from before backwards; the terminal segment of the abdomen equals the two anterior in length; it terminates in a rounded extremity.

The *antennules* (fig. 5) are about equal in length to the cephalothorax; the basal joint is long and stout, and much longer than the rest of the appendage; the two following joints decrease progressively in length and in breadth; the two distal joints of the appendages are each somewhat longer than the third, but narrower.

The *antennæ* (fig. 5) are shorter and more slender than the antennules; the basal joint is very short, the two following are somewhat longer and subequal; the fourth joint is much the longest and is about equal to the two last taken together; the appendage terminates in two short slender joints which appear to represent the flagellum.

The *maxillipedes* are shown in fig. 6; each is furnished with a long four-jointed palp.

The most characteristic appendages of the male *Paratanais dimorphus* are, however, the *chelipedes*; they appear to be not unlike the chelipedes of the genus *Leptochelia* in general form, but are rather more massive; this species, however, cannot be classed in the

genus *Leptochelia* on account of the form of the uropoda; in *Leptochelia* the uropoda are biramose, but the outer branch is rudimentary and one-jointed, while the inner branch is multiarticulate; in the present species they are characteristically similar to those of *Paratanais*. The antennules of the male *Leptochelia* have a far larger flagellum (five to nine joints) than is to be found in this or other species of the genus *Paratanais*. In figs. 3, 4 of Pl. XVII. the chelipedes are shown in two different positions; the most remarkable feature about this appendage is the "hand," which is extremely large and of an unusual structure; the distal joint or "finger" is immensely elongated and reaches back as far as the second joint of the appendage when in a condition of rest; the fifth joint has as usual a long prolongation which forms the lower limb of the forceps; this region of the fifth joint is, however, not rigidly connected with the proximal portion, but is freely movable upon it by means of an articulation; when the limb is not being used for prehensile purposes this joint appears to take the position indicated in fig. 4; it lies back along the fourth joint, and is covered by it; the distal joint of the limb lies back parallel to this, so that the whole appendage comes to have a superficial similarity to the corresponding appendage in many other Isopods, such as, for example, *Serolis*. At the point of articulation with the proximal region of the fifth joint the distal portion is narrow, afterwards it is wide and uneven, and along the inner margin projects into two tooth-like processes of which the distal is the longer; the extremity of the joint is pointed and curved upwards.

The remaining *thoracic appendages* are like those of the female, and are specialized into two series; the three anterior pairs are more slender than the three posterior pairs.

All the *abdominal appendages* are present; the five anterior pairs (fig. 8) have the normal structure, consisting of a stouter basal joint and two flattened rami fringed with long hairs.

The *uropoda* (fig. 7) are longer than the terminal segment of the abdomen; they are biramose, each of the rami being distinctly two-jointed; the exopodite is, however, more slender than the endopodite. The structure of those appendages is therefore quite in accord with the systematic position assigned to the species.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; lat. 48° 45′ S., long. 69° 14′ E.; depth, 127 fathoms; volcanic mud.

Bathytanais, n. gen. ?

In my third preliminary notice on the Challenger Isopoda[1] I described a species from deep water in the North Pacific, under the name of *Paratanais bathybrotes*. Since then I have examined a large number of individuals from Port Jackson, which seem hardly to differ specifically. As there were a large number of individuals there were probably

[1] *Proc. Zool. Soc. Lond., loc. cit.*

males as well as females among them, though I am bound to say that I did not discover any decided evidence of a difference of sex, unless the elongation of the abdomen marks the males in this species as it does in the genus *Leptognathia*.[1] This being the case, the four-jointed antennules and antennæ in both sexes will perhaps be considered to constitute a generic character.

In no genus are these appendages four-jointed in both sexes, though frequently (*e.g.*, *Leptognathia*, *Cryptocope*) they are four-jointed in the female. Professor Sars, in his Revision of the Tanaids, mentions that in *Haplocope*, *Strongylura*, and *Anarthrura*, the antennules of the female are four-jointed, but he makes no statements respecting the males of these genera. This present genus, however, cannot be confounded with either of the three, since it possesses distinctly separate ocular lobes, which are wanting in the genera above referred to.

Bathytanais bathybrotes, F. E. Beddard (Pl. XVII. figs. 9–14).

Paratanais bathybrotes, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 119.

This species is represented by a single individual from the great depth of 2050 fathoms. Judging from the antennules it is a female, though there were no other marks of sex to decide the point conclusively. The specimen measures about 4 mm.

The general shape of the body is elongated and narrow as in other species of the genus. The surface of the body appears to be perfectly smooth.

The cephalothoracic shield is about as long as the first two segments of the thorax, it is narrower anteriorly than posteriorly, and projects as a wide, obtusely pointed, rostral process. The ocular lobes are present though small and pointed anteriorly, they contain an abundance of reddish-brown pigment, and the vitreous bodies of the eyes were also plainly visible through the integument. This is one of the few deep-sea species in which eyes are well developed.

The first free segment of the thorax is rather shorter than the rest, which are subequal.

The length of the abdomen is about one-fourth of the length of the entire body; the five proximal segments are short and subequal, the first alone being a trifle longer than the rest; the terminal segment of the abdomen is longer; it is rounded and bent down at the extremity.

The *antennules* (fig. 11) have a very characteristic form; the basal joint is as long as the rest of the appendage, and is extremely wide and flattened, much more so than in any other Tanaid known to me; the following joint is short and wide, the third joint of the peduncle is no longer but is narrower than the preceding; the flagellum consists of a single joint somewhat conical in form, the narrow end being the distal. At the extremity

[1] G. O. Sars, Revision af Gruppen Isopoda, Chelifera, &c., *loc. cit.*, p. 40.

of the flagellum is a tuft of exceedingly long slender hairs which are quite twice the length of the whole appendage; as in other Tanaids there appear to be no auditory hairs upon the last joint of the antennule, and perhaps this fact is in favour of regarding the last joint as belonging to the peduncle and not representing the flagellum, which in that case would be absent.

The *antennæ* (fig. 12) are rather shorter than the antennules, but like them appear to consist of only four joints, five being the usual number found in this appendage in other Tanaids. The first joint is wide and flattened, and is prolonged on the inferior surface for some way beyond the articulation of the second joint, in fact, as far as its distal extremity; the second joint is altogether smaller than the first joint but has the same general form; it is widened and flattened and projects on the ventral side for a short distance beyond the third joint; the latter is of about the same length as the preceding joint, but narrow and cylindrical; the distal joint of the appendage is short and narrows towards its termination.

A large number (fourteen) of individuals dredged in 2 to 10 fathoms, in Port Jackson, appear to me to be hardly distinguishable from this species, which thus is an example of the very unusual occurrence of a species which is common to very shallow water and to the great abysses; such instances in the Isopoda are so extremely rare that I am inclined to doubt whether there has not been some mistake made with reference to the specimen alleged to be from Station 246, 2050 fathoms; at any rate, for the present, it appears necessary to regard the fact of its occurrence in very deep water with a certain reserve.[1]

Among the specimens dredged in shallow water at Sydney there are two series of individuals which I imagine to be males and females respectively; in certain individuals the abdomen is distinctly longer than in others, and as this sexual difference occurs in *Leptognathia* it is probably a mark of sexual distinction in the present species; it is the only one, at any rate, that I could detect. There is absolutely no difference in the structure of the antennules; they are perfectly similar in all the fourteen individuals.

Station 246, Mid North Pacific, July 2, 1875; lat. 36° 10′ N., long. 178° 0′ E.; depth, 2050 fathoms; bottom temperature, 35°·1 F.; Globigerina ooze.

Port Jackson, 2 to 10 fathoms.

[1] It must be remembered, however, that a species of *Typhlotanais*, labelled on a slide during the Expedition from Station 246, is apparently identical with *Typhlotanais kerguelenensis;* hence there is some independent evidence from analogy, in favour of supposing that no mistake has been made with respect to the occurrence of *Bathytanais bathybrotes* in deep water as well as shallow.

Family ANCEIDÆ.

Anceus,[1] Risso.

Gnathia, Leach, Edin. Ency., vol. vii.
Anceus, Risso, Crust. d. Nice, p. 51, 1816.
Praniza, Leach, MSS.

Anceus bathybius, F. E. Beddard (Pl. XVIII. fig. 1–7).

Anceus bathybius, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 119.

Only a single representative of this genus, was dredged in deep water, and it consists merely of a single fragment comprising the head and the thorax; the abdomen has entirely disappeared.

The specimen is a male, and measures about 10 mm. in length.

The head is squarish in outline and terminates anteriorly in a long obtusely pointed rostrum, which has a tuft of hairs at its free extremity; the dorsal surface of the head is traversed by several shallow furrows. Eyes are completely absent. The first three of the free thoracic segments are much shorter than the two following, but of about equal width; the first segment is shorter than the two next, which are subequal; the fourth is about equal in length to the second and third taken together; the fifth is rather longer again. The surface of the body is smooth and unmarked with spines or tubercles.

The *antennules* are about as long as the rostrum; they consist of three basal joints and a flagellum of five joints; the two proximal joints of the peduncle are short, the distal joint is about equal in length to the two basal joints taken together. In the flagellum the first joint is extremely minute, the second rather long, the three following joints progressively decrease in length, the terminal joint being again extremely minute.

The *antennæ* are longer than the antennules; the peduncle is four-jointed; the first joint is moderately long, the second shorter; the third and fourth joints are of considerable length, the fourth being the longest; the flagellum is short, about equal in length to the last joint of the peduncle; it consists of about six short slender joints.

The *mandibles* have the usual structure characteristic of the males of this genus; in the present specimen they were extended forwards parallel with the longitudinal axis of the body, and reached to a point rather beyond the end of the rostrum; these appendages are shown in fig. 1, 2, each is somewhat bent and terminates in a blunt tooth; from the inner side nearly halfway down is another tooth-like projection.

[1] There seems to be some difference of opinion as to the correct name to be applied to this genus; I have here followed Westwood and Spence Bate. I imagine that, strictly speaking, a new name ought to be employed, since *Gnathia* and *Anceus* were applied to the male only and *Praniza* to the female. I am unwilling, however, to create a new generic term for so well-known an animal.

The *maxillæ* appear to be unrepresented.

The *maxillipedes* (fig. 3) are like those of other species; the outer margin of the four joints of the exopodite are fringed with long branched hairs, the inner margin of the same joints are delicately pilose, as also the broad basal joint of the appendage and the endopodite; the latter terminates in a subacute point; just before the extremity are a row of eight of the peculiar bodies that are found in this situation in most Isopoda; these are shown more highly magnified in fig. 4; the denticulate margins of the swollen dorsal extremities of these structures are particularly distinct and suggest that they serve to interlock the appendage with its fellow of the opposite side.

The *first pair of thoracic appendages*[1] (fig. 5), as in other species, are modified into an operculum, which extends to the extremity of the rostrum, and of course entirely covers the subjacent mouth appendages; each of these appendages, which are closely apposed in the middle line, consists of five joints; the two proximal joints are short and rounded; the third joint is the most important in the whole limb, the two distal joints are short (there is evidently a terminal joint missing). Both margins of this appendage are densely pilose; the outer margin of the third joint has a row of widely-separated, long, plumose hairs like those which fringe the maxillipedes; these were continued in one instance for a short distance on to the fourth joint; the upper and inner margins of the three terminal joints are fringed by two rows of entirely similar hairs.

Of the remaining thoracic limbs one of each of the four pairs were present; the two anterior pairs of limbs differ from the posterior in being very much more slender than the latter.

One of the anterior appendages is figured in Pl. XVIII. fig. 6. The proximal joint is the longest, the two next subequal in length and each of about one half the length of the proximal joint; the next joint is a little shorter as well as more slender; the fifth joint is longer and narrower, while the terminal joint is the shortest and armed with a claw at its extremity. The distal joints of the appendages are furnished along the inner margin with strong spines as well as with long slender hairs.

The third and fourth pairs of ambulatory limbs (fig. 7) are very much the same in structure, but the joints of which they are composed, that is to say, the three proximal joints, are much stouter and stronger than in the more anterior thoracic appendages; the distal joints are much more slender than the proximal joints, and are, in fact, very similar to those of the preceding appendages; the fourth joint is rather more swollen, and the

[1] On both of these appendages, or rather inside them, in the second and third joints along the inner margin were a number of round, granular, nucleated bodies, which I believe to be the eggs of a parasitic Nematode, as there was in each appendage a young worm, evidently a Nematode, curled up among the eggs. I think it worth while to record this fact, as it is a remarkable situation in which to find these parasites. Dr. v. Willemoes-Suhm has spoken of a species of *Gordius* which he found parasitic in a deep-sea shrimp curled up under the carapace (*Proc. Roy. Soc.*, vol. xxiv. p. 572), and I have myself called attention to a parasitic (?) Nematode which frequents the body of *Serolis neæra* (Zool. Chall. Exp., part xxxiii. p. 60, note). The present is another instance of the occurrence of these parasites in deep-sea Crustacea.

limb thereby acquires a prehensile character, as the terminal joints are bent back upon the somewhat dilated fourth joint.

Station 76, July 3, 1873; lat. 38° 11′ N., long. 27° 9′ W.; depth, 900 fathoms; bottom temperature, 40° F.; Pteropod ooze.

Anceus gigas, F. E. Beddard (Pl. XVIII. figs. 8–10).

Anceus gigas, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 120.

This species is represented by half a dozen individuals, male and female, dredged at a depth of 127 fathoms off Cumberland Bay, Kerguelen.

It is remarkable for being quite the largest species of the genus at present known, the largest specimens measuring as much as 16 mm. in length; the females are hardly smaller than the males.

The head is rough and tubercular, especially laterally, where the surface is separated by transverse furrows into two folds; the anterior margin of the head is comparatively straight, only broken by three minute processes, one of which is in the middle; the eyes are well developed, and the antero-lateral margin of the head beyond the eyes projects forward.

The central region of the head is depressed.

Between the concave posterior border of the head and the first complete free thoracic segment a small crescentic segment is interpolated, which does not reach to the lateral margins of the body; this represents an anterior thoracic segment. The three first segments of the thorax increase gradually in length, the first being the shortest; the lateral regions of these segments are much roughened, the dorsal regions smooth; these segments are convex above in the middle line; the third segment is convex above posteriorly, and flattened anteriorly.

The two posterior segments of the thorax are as usual very much longer than those which precede them; the fourth segment is about as long as the second and third taken together, the fifth rather longer but narrower than the fourth. The dorsal surface of these is smooth and tumescent, being beset with scattered hairs. In both segments the region just overlying the articulation of the appendages which corresponds with the epimeron is, like the same part of the anterior segments, roughened.

Between the fifth free segment of the thorax and the abdomen there appears to be an intercalated segment which is similar in shape to the succeeding abdominal segments, but is without epimera or appendages; it has a distinct sternum.

The *abdomen* is narrow and short, as in all the other species of this genus; it measures in length rather more than the fifth segment of the thorax. The first five segments are equal in diameter, increasing slightly in length from before backwards; well-developed sickle-shaped epimera are present on all these segments, they are much bent down so as

to be almost invisible on a dorsal view; the epimera are articulated by a distinct suture with the terga, and for about one-third of their length pass outwards approximately in the same direction as the terga of the segments; the rest of the epimera is bent downwards quite at right angles to the proximal region; the upper (outer) margin is somewhat concave; the terminal segment of the abdomen is itself rather shorter than the foregoing, but has a greatly elongated telson spine, rounded at the extremity; it has no epimera, the terminal appendages or uropoda being articulated at its extreme lateral margin.

The *antennules* are short, with a four-jointed peduncle; the two proximal joints are short, the third very long, the fourth joint extremely small and rudimentary; the flagellum has four joints, and is not so long as the third joint of the peduncle.

The *antennæ* are nearly twice the length of the antennules; the peduncle is five-jointed, with three very short basal joints and two long distal joints; the flagellum is rather longer than the distal joint and has eight joints.

The *mandibles* terminate in a pointed extremity; the basal region is much broader and projects on the inner side where it is denticulate.

The *maxillæ* as in other species appear to be absent.

The *maxillipedes* resemble very closely the corresponding appendages of *Anceus bathybius*, but the endopodite is shorter in proportion and does not project far along the second joint of the palp.

The operculiform *first pair of thoracic appendages* (Pl. XVIII. fig. 10) again resemble very closely those of *Anceus bathybius*, but differ from those of other species, for instance those recently described by Sars from the Norwegian Expedition,[1] in having six well-developed joints.

The two basal joints are comparatively short, the third is greatly elongated, the fourth and fifth are very short and subequal, while the sixth joint is extremely minute. The inner margin of the second, third, and fourth joints is fringed with long plumose hairs, which are absent on the two last joints. The penultimate joint is almost covered with stout hairs on its inner half.

The remaining *thoracic appendages* are similar to each other; they are stout clawed limbs.

The penial process is double.

The abdominal appendages are not so purely respiratory as in *Anceus stygius*, that is to say, both endopodite and exopodite are fringed with long plumose hairs.

The *Praniza* form of this species (fig. 9) is represented by a number of individuals rather smaller than the males; two large specimens have the characters of mature females, the middle segments being tumid and swollen. A very considerable number of smaller immature specimens are also contained in the Challenger collection; these may be the larval forms of the present species, or they may belong to the next species, *Anceus tuberculosus*.

[1] *Loc. cit.*, p. 85.

The adult *Praniza* measures about 12 mm. in length; the colour is whitish, and the integuments are thin and translucent, besides being smooth and free from the sculpturing which ornaments the body of the male.

The head is triangular in outline owing to the projection of the mouth appendages, which converge to a point some way in front of the anterior margin of the head itself; the latter is straight and slightly in advance of the articulation of the antennæ. The eyes are large, oval, and occupy the sides of the head.

The first segment of the thorax is smaller than either of the two following, but it is not so rudimentary as in the male. The two following segments are subequal, with rounded lateral margins.

The three next segments are completely fused together and form a swollen area as in other species of this genus; the integument is thin and but little calcified, with the exception of an oval plate closely applied to the third segment, and three lateral hard pieces, to which are articulated the three pairs of appendages belonging to these segments.

The abdominal segments have their epimera compressed, and as it were tucked away under the body, as in the male.

The thoracic limbs are more slender than in the males.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; depth, 127 fathoms; volcanic mud.

Anceus tuberculosus, F. E. Beddard (Pl. X. figs. 8-12; Pl. XVIII. fig. 12).

Anceus tuberculosus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 120.

A second species of *Anceus*, dredged at Kerguelen, cannot be confounded with *Anceus gigas*.

It is represented by two males and one female, the largest (male) specimen measures only 5 mm. in length. The two male specimens differ slightly from each other, more particularly in colour, but they are evidently referable to one and the same species.

The head is prolonged in the middle line into a short rostrum, which is squarish and truncated in form, with a slightly concave anterior extremity; for a short space on either side of the rostrum the anterior margin of the head is quite straight; it then slopes backwards and forms a jutting projection in front of the eyes; the dorsal surface of the head is very convex behind and flattened, sloping downwards and forwards in front; the posterior convexity is divided into two by a median furrow; the dorsal surface of the head, especially posteriorly, is covered by many large, roughened tubercles. The posterior margin of the head is concave.

The first free segment of the thorax, which is represented by a semicircular tergal plate following the head, is covered like it with a series of tubercles, which are, however, limited to the anterior convex region of the segment.

The remaining segments of the thorax increase in length up to the fifth; their width increases up to the third, and thence diminishes gradually though not to any marked extent.

The three anterior segments of the thorax, including the rudimentary first segment, are subequal in length as well as breadth to the head; the second has a row of tubercles across the median region, the third has a few similar tubercles; the other segments of the thorax as well as the abdomen are smooth and free from any tubercles although hairy in places. Just posterior to the articulation of the limbs in the third segment, that is to say along the postero-lateral margin of that segment, is a short conical spine; the antero-lateral margin of the succeeding segment has two such spines close together, the outer being the larger. Between the third and fourth segments is a considerable break, a deep lateral incision dividing them; the postero-lateral margin of the fourth has a stout mammilla-like process which answers to the postero-lateral spine of the third. The fourth segment is separated by a moderately deep incision from the fifth, which is closely applied to the sixth, the two together forming almost a continuous piece, though the line of suture is evident enough; the fifth segment is, as usual in this genus, divided by a median longitudinal furrow into right and left halves; the lateral margin of the fifth segment is divided by constrictions into three areas, of which the median overlies the articulation of the limbs; the sixth segment is divided by transverse constrictions into three projecting areas, beneath the posterior of which the limbs belonging to this segment arise; the postero-lateral margin of this segment, as of the fourth segment, is prolonged into a process. Between the sixth segment of the thorax and the first segment of the abdomen is intercalated a small segment of about the same length and width as any of the succeeding segments of the abdomen; it differs from them, however, in not being furnished with epimera; nor has it any trace of appendages; the rudimentary condition of this segment, which appears to be equally rudimentary in all species of the genus, is an embryonic character, inasmuch as this segment in other Isopoda is the last to appear (*cf.* description of young of *Eurycope novæ-zealandiæ*, p. 63).

The *abdomen* measures a little more than one-fourth of the entire length of the body; the segments of which it is composed gradually increase in length up to the fifth; they are furnished with well-developed sickle-shaped epimera quite separate from each other; those of the first abdominal segment are considerably smaller than of those which follow; the epimera stand out from the body and are not compressed as in *Anceus gigas;* the terminal segment of the abdomen has no epimera, and it terminates in a peculiarly notched extremity.

The *antennæ* (Pl. X. figs. 8, 9), resemble those of the preceding and other species of the genus in almost every particular; in both pairs of appendages, however, the flagellum appeared to be a joint shorter than in *Anceus gigas.*

The *mandibles* differed slightly in the two individuals; in one specimen they are much as is shown in fig. 10 of Pl. X.; in the other specimen (Pl. XVIII. fig. 12), the denticulations along the inner margin are absent, their place being taken by a single broad triangular process.

The *thoracic appendages*, those that form the ambulatory limbs, are subsimilar; one of these appendages (the sixth of the right side) is displayed in fig. 11 of Pl. X.; the proximal joint has a stout spine on the outer margin, the following joints have shorter but similar spines on the inner margin; there is some difference in the number, size, and position of these spines in the different pairs of appendages.

The *abdominal appendages* (Pl. X. fig. 12), are all similar to each other with the exception of the last pair; they consist of a stout, basal joint, into which are articulated a flattened, tongue-shaped endopodite and exopodite, the latter being the shorter; there appear to be no setæ present upon these appendages.

The *uropoda* differ from these appendages in being somewhat stouter and in having serrate margins fringed with long hairs; the endopodite reaches nearly to the end of the telson, the exopodite not so far; in one specimen the telson spine was rather shorter than in the other, and the uropoda therefore reached quite to its extremity.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; depth, 127 fathoms; bottom, volcanic mud.

Station 149C, Royal Sound, Kerguelen; depth, 30 fathoms, from dredge; bottom, volcanic mud.

Anceus latidens, F. E. Beddard (Pl. XVIII. fig. 11).

Anceus latidens, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 120.

A single male specimen of this small *Anceus* was dredged in 7 fathoms in Flinders Passage, North Australia.

The specimen measures 2·5 mm.; it is of a rich brown colour, darker in parts.

The head is squarish in outline, being about as broad as it is long; the posterior margin of the head forms two curves, meeting in the middle line, where there is a deep incision which is continued forwards for some way in the shape of a median furrow between the two lateral convexities of the head, which are evenly convex above; in front of the eyes is a short, somewhat outwardly directed, spiny process, which marks the antero-lateral boundary of the head. The anterior margin of the head is prolonged in the middle line into three short blunt protuberances, of which the middle one is the longest. The surface of the head is covered with numerous small rounded tubercles, which are entirely absent for a space around the posterior median furrow.

The first segment of the thorax is as usual extremely short, and does not extend any further laterally than the lateral margin of the head; the two following segments are

short and subequal, with rounded lateral margins; the dorsal surface of all these segments has numerous tubercles similar to those upon the head, which become rather less numerous, though they do not disappear, in the median line. The fourth thoracic segment is separated by a considerable interval from the third, the interspace being occupied by chitinous integument which is apparently not calcified; this segment is tuberculate like the others, but not quite to so great an extent; its anterior margin is slightly concave in the middle line, like the posterior margin of the head. The two following segments differ from the anterior segment of the thorax in being perfectly smooth dorsally; the first of these segments is divided into right and left halves by a median longitudinal furrow as in other species; the sixth segment projects on either side beyond the terminal border of the segment; between this segment and the first segment of the abdomen is an oval sclerite, which probably, as has been suggested by Dohrn,[1] represents the seventh thoracic segment. On the ventral side these posterior (fifth and sixth) segments of the thorax are as in other species uncalcified or incompletely calcified.

The first five segments of the abdomen are subequal; their lateral margins are furnished with sickle-shaped epimera, which are directed downwards, as in *Anceus gigas*, and not outwards, as for instance in *Anceus tuberculosus*. The terminal segment of the abdomen ends in a finely pointed extremity.

The *antennules* have the ordinary structure; the two basal joints are short and subequal; the third joint is as long as both together, but more slender, the fourth joint is very minute; the flagellum is four or five-jointed, and shorter than the peduncle.

The *antennæ* have a peduncle consisting of four joints; the first two are rather short and subequal, the third longer, and the fourth longer still; the distal joints have a few fine hairs along the outer margin; the flagellum is about as long as the last joint of the peduncle, and has six joints; it gradually tapers towards the extremity.

The *mandibles* have the form depicted in fig. 11; the inner margin is extremely prominent, and is bent with numerous crenulations. I am unable to describe the *maxillipedes* as they were entirely concealed by the first pair of legs.

The latter are very much like those of *Anceus stygius* described and figured by Sars, and indeed like the majority of species; they consist of a large basal joint, at the extremity of which is a small oval joint; at the distal extremity of this is a minute tubercle which represents the third joint; this description may be compared with that of the same appendages in *Anceus bathybius*. The remaining thoracic appendages are subsimilar. The basal joint is stout and fringed along the inner margin with rows of short spines, which are also found upon the more distal joints; the three following joints are moderately stout and gradually decrease in length; the distal joint is as long as the second joint but narrow, the short terminal joint bears a single claw; a few slender hairs are developed upon all the joints.

[1] Entwickelung und Organisation von Praniza (Anceus) maxillaris, *Zeitschr. f. wiss. Zool.*, Bd. xx., 1869.

The *abdominal appendages* have the usual form; both rami appear to be setose, the outer more so than the inner; the uropoda extend beyond the termination of the abdomen and are very setose.

Flinders Passage, North Australia; depth, 7 fathoms.

Family ANTHURIDÆ.

Paranthura, Spence Bate.

I describe two species here, one of which, *Paranthura chiltoni*, would be referable to Harger's genus *Ptilanthura*,[1] since the antenna in the male has a many-jointed swollen flagellum with numerous hairs. The same is the case with specimens which I believe to be Stimpson's[2] *Anthura catenula*; in this species the palp of the antennules in the male is twelve to fourteen-jointed, in the female quite rudimentary, and three to four-jointed. A species described by Haswell[3] under the name of *Paranthura crassicornis* has the same peculiarity. The occurrence of this family in deep water is noted here for the first time. The description of the specimen from Kerguelen is, I am afraid, rather meagre, but the specimen being immature, it was difficult to select its distinctive specific characters. The description, however, will emphasize the occurrence of the genus in shallow water at Kerguelen, whence it was only known from an incidental notice by the late Dr. v. Willemoes-Suhm under the name of *Anthura*.

Paranthura chiltoni, n. sp.

I dedicate this species to Mr. Charles Chilton, who has done so much valuable work among the New Zealand Isopoda.

The single specimen measures 17 mm. in length.

The head is oval in contour, rather shorter than the first thoracic segment; it is prolonged into a rostrum between the antennules; laterally it extends beyond the insertion of these appendages; eyes are completely absent.

The segments of the thorax increase progressively in length up to the fourth, the fifth is about equal in length to the fourth, the sixth and seventh successively diminish in length. The first two segments are broader anteriorly than posteriorly; the middle segments are oval, being widest in the middle; these differences in form are owing to the shifting position of the thoracic appendages, the segments being widest where these are attached. The first three pairs of appendages are articulated close to the anterior margin of their segments, the fourth, fifth and sixth at the middle of the segment, the two posterior pairs being moved a little nearer to the posterior end; the appendages of the

[1] New England Isopoda, Rep. U.S. Fish. Com., Washington, 1880. [2] *Proc. Acad. Nat. Sci. Philad.*, vol. vii., 1885.
[3] On some new Australian Marine Isopoda, *Proc. Linn. Soc. N.S.W.*, vol. v. p. 478.

last segment are articulated close to its posterior boundary. The abdomen is rather more than one-fourth of the length of the thorax; the first segment is a little longer than any of the four following which are subequal; the terminal segment is of course longer, and ends in a flattened scale-like telson, which is rounded at its free extremity.

The *antennules* are furnished with a long flagellum, but it is difficult to indicate precisely the limits of flagellum and peduncle. The basal joint is stout, and the longest of the whole appendage; the second joint is much shorter, the third a little longer than this, and the fourth very short but of equal diameter; then follows the flagellum, the proximal joints of which do not differ from the distal joints of the peduncle; the first joint is the largest, the remaining nine decrease gradually in width, but increase slightly in length towards the extremity. The antennules are altogether longer than the head.

The *antennæ* are shorter than the foregoing appendages; the peduncle is five-jointed; the basal joint is very short, the second joint is the longest, and is excavated along its outer and inferior border, apparently to make room for the dilated proximal joint of the antennules; the following joints are short and stout, the distal joint being the longest and most slender; the flagellum is four-jointed and very slender, the proximal joint is the longest, the others progressively but very gradually diminish in length; the last joint is tipped with a bundle of fine hair-like setæ.

The first pair of *thoracic appendages* are chelate; the second and third pairs are also chelate, but more slender than the anterior pair, the remaining appendages similar to each other and without a dilated penultimate joint. First pair of abdominal appendages serrate along the inner margin and a part of the outer; remaining pairs with long plumose hairs. *Uropoda* of the characteristic form, overlapping the posterior abdominal segment and telson; the outer ramus is square and truncated at its extremity; the inner ramus is two-jointed, serrated, and furnished with a few short hairs along the inner margin.

Station 169, off New Zealand, July 10, 1874; lat. 37° 34′ S., long. 179° 22′ E.; depth, 700 fathoms; bottom temperature, 40° F.; blue mud.

Paranthura neglecta, n. sp.

This species is represented by a single specimen from Kerguelen; I imagine the specimen to be immature from the absence of a seventh thoracic segment.

The length of the specimen is 6 mm.

The head is furnished with a pair of lateral eyes, each containing eleven or twelve facets; the head is produced laterally beyond the insertion of the antennules; it is about equal in length to the following thoracic segments, which are themselves subequal.

The attachment of the thoracic appendages appears to be much the same as in the

last species; the anterior three pairs are attached close to the anterior border of their segments, the two middle pairs close to the middle, and the posterior pair at the posterior extremity of its segment.

The abdomen is one-fifth of the length of the thorax; the first segment is rather longer than the three following, which are subequal, the segment is about equal in length to the first.

The *antennules* are more slender and shorter than the antennæ, and are much shorter than the head; they are four-jointed, the basal joint being the longest and stoutest; the three distal joints are subequal in length but diminish progressively in width.

The *antennæ* are shorter than the head but considerably longer and stouter than the antennules. The basal joint is excavated in the same fashion as in *Paranthura chiltoni* in the stoutest and largest joint; the following joint is extremely short, the two following longer, the more distal being the longer of the two; the terminal joint of the appendage is short and narrow and bears a dense tuft of hairs at its free extremity.

The *thoracic appendages* are specialised in the usual way, as in the last described species for example.

Station 149H, off Cumberland Bay, January 29, 1874, Kerguelen; depth, 127 fathoms; volcanic mud.

Family Sphæromidæ.

There is perhaps no family of the Isopoda in which the makers of new species and genera have run riot to the extent that they have in the Sphæromidæ; and the explanation of this is that the sexual dimorphism of many species is so pronounced that the males and females have often been assigned to different genera. So very many species and genera have been described, and in many cases so imperfectly, that it becomes a matter of the greatest difficulty to discriminate between new species and those that have already received a name, if not an adequate description. The family is evidently in need of a revision; but since this would be beyond the scope of the present work, it is hoped that in criticising the following new species the difficulties attending the study of this section of the Isopoda will be borne in mind.

Gerstæcker in his account of the Isopoda, in vol. v. of Bronn's Klassen und Ordnungen des Thierreichs, has associated together many genera regarded by naturalists, or at least regarded by some naturalists, as distinct; he includes within the genus *Sphæroma*, *Zuzara*, *Cycloidura*, *Isocladus*, and refers *Dynamene* to *Cymodocea* and *Cilicæa* to *Nesæa*; with this alteration I thoroughly concur, but would further associate *Nesæa* and *Cilicæa* with *Cymodocea*; the chief distinction between the two former genera and the latter is in the form of the uropoda, and I shall have occasion to show, in the course of

the following pages, that in certain Sphæromids the males only are furnished with uropoda, in which the exopodite is long and curved, the endopodite being fixed, and rudimentary, while in the females both endopodite and exopodite are subequal; the genus *Cilicæa* is distinguished from *Nesæa*, or at least is supposed to be distinguished, by the long spine into which the median dorsal region of the anterior abdominal segments is prolonged. This, however, has been shown by Mr. Haswell to be, at least in one species,[1] a sexual character, the spine being entirely absent in the female; some species of *Cilicæa* have uropoda like those of *Cymodocea*, while in others the exopodite of the uropoda is alone fully developed. But a more striking argument, perhaps, as to the impossibility of making the form of the uropoda a basis of generic distinction, is to be derived from the study of a new deep-sea species described in the present Report (p. 150); of this species, which I have named *Cymodocea abyssorum*, there are two specimens, one a male and the other a female; they were obtained at the same Station, and agree so exactly in every detail of their structure, except in the form of the uropoda, that I cannot but regard them as belonging to the same species; in the male the uropoda are like those of the typical *Nesæa*, while in the female the two rami are equally developed, as in *Cymodocea*. M. Hesse[2] has also brought forward very strong arguments in favour of regarding many supposed generic distinctions as being merely sexual differences.

Mr. E. J. Miers, in his account of the Crustacea dredged by the "Alert," has referred to the probability that *Nesæa latreillei* is probably only the male of *Cymodocea*.

I am able to confirm this supposition by the examination of a series of this species in the Challenger collection. The specimens were obtained at Station 190, and consist of one fully developed male, several females, and one young male, in which the dorsal spine is just beginning to make its appearance, though the uropoda have equal rami like the female; in the fully developed male the fixed endopodite is rudimentary, while the exopodite is a long, stout, curved joint.

All the specimens were obtained at the same haul of the dredge, and are so alike in other respects that I cannot but regard them as belonging to one and the same species.

The genera *Isocladus* of Miers, and *Zuzara* of Milne-Edwards, have been distinguished from *Sphæroma* by the presence of a long spiny out-growth of the last segment of the thorax; I have lately received, through the kindness of Mr. G. M. Thomson, specimens of *Isocladus armatus* from New Zealand, in some of which this spine was present and in others absent. Mr. Thomson expressed to me in a letter his suspicions that this difference might in reality prove to be sexual, in which case there would be no necessity to remove the species from the genus *Sphæroma;* a careful examination of the specimens forwarded has convinced me that Mr. Thomson's suspicions are correct, and that it is only the male which has a dorsal spine, the female being a

[1] *Cilicæa hystrix, Proc. Linn. Soc. N.S.W.*, vol. vi. p. 185.

[2] *Ann. d. Sci. Nat.*, ser. 5, t. xvii.

typical *Sphæroma;* it must be remembered, however, that *Sphæroma* (*Isocladus*) differs from *Cilicæa* in that the dorsal spine is developed from the terminal segment of the thorax, while in *Cilicæa* it is an outgrowth of the abdomen; hence, there is no possibility of confounding these genera, although, on a superficial view, the similarity is great.

There are no reasons at present for supposing that *all* the species of the genera *Cymodocea* and *Sphæroma* exhibit this sexual dimorphism—in fact *Sphæroma gigas* certainly does not; but this is no reason for separating generically those forms with a well-marked sexual dimorphism from those without any great sexual differences, unless we have here a case of protective mimicry analogous to that exemplified in many Butterflies; for the present, therefore, it appears to me to be necessary to regard *Cymodocea*, *Nesæa* and *Cilicæa* as synonymous; I shall describe a new species under the generic title of *Cymodocea*.

The family Sphæromidæ is almost universally distributed, and is according to Gerstæcker more specially characteristic of the temperate regions, though found sparingly everywhere else. It is pre-eminently a shallow-water family, only one species, *Cymodocea abyssorum*, being found in the great depths of the ocean. It is interesting to note that in this species there are certain structural peculiarities analogous to those exhibited by *Bathynomus* and *Anuropus* (see p. 152), which may perhaps be the result of the habitat; the fourth and fifth pairs of abdominal limbs are in all Sphæromidæ modified into respiratory organs, the endopodite taking on this function more particularly, while the exopodite remains thin and membranous and serves as an operculum; in *Cymodocea abyssorum* both endopodite and exopodite are respiratory in structure, having the form of complicated folded plates. This fact, however, perhaps loses a good deal of its significance since exactly the same condition is met with in *Amphoroidea*, while *Anuropus* has no shallow-water allies in which there is a similar hypertrophy of the respiratory lamellæ. In *Amphoroidea typica* the fourth and fifth pairs of abdominal appendages are described and figured by Milne-Edwards as being exactly similar in structure to the one of *Cymodocea abyssorum*, and in *Amphoroidea falcifer*,[1] from New Zealand, I have myself observed precisely the same modification of their structure.

The eyes of *Cymodocea abyssorum* are white in colour, owing to a complete absence of pigment, a character frequently met with in deep-sea Isopoda.

Ceratocephalus, White, MS.

Ceratocephalus, White, MS., Woodward, Art. Crustacea, Encycl. Brit., ed. 9, p. 659.
Bregmocerella, Haswell, Proc. Linn. Soc. N.S.W., vol. ix. p. 1004.

This genus of Sphæromidæ has been described almost simultaneously by two different writers. Dr. Woodward, in his article Crustacea, published in the 9th edition of the

[1] A species kindly forwarded to me by Mr G. M. Thomson.

Encyclopædia Britannica, has written a short description, accompanied by figures, of a small Isopod from Flinders Island, Bass Strait, under the MS. name given by White.

There appears to be no doubt that *Bregmocerella*, a new genus lately instituted by Haswell, is identical with *Ceratocephalus*, and it is necessary, therefore, to cancel Haswell's name, as *Ceratocephalus* has evidently the priority. Both descriptions, which are very brief, refer only to the male. As the Challenger obtained a great number of specimens, including females, I have thought it worth while to give a more detailed description of this Sphæromid, which is to be distinguished from any of its allies by the long "horns" upon the head and the greatly elongated antennæ; in other respects *Ceratocephalus* does not depart far from the structure characteristic of the Sphæromidæ.

Ceratocephalus grayanus, White, MS.

Ceratocephalus grayanus, White, MS., Woodward, Art. Crustacea, Encycl. Brit., ed. 9, p. 659.
Bregmocerella tricornis, Haswell, Proc. Zool. Soc. N.S.W., vol. ix. p. 1004.

This species is represented by a large number of individuals from Port Jackson, and from localities further to the south, at Station 161. The individuals from Port Jackson are all of small size, the largest specimen measuring 17 mm., including the rostrum. Three specimens were dredged at Station 161, two of which measure as much as 28 mm. in length; apart from the larger size of the latter there is no difference between the individuals from the two Stations, at least no difference that would seem to necessitate their separation as distinct species.

This species exhibits a well-marked sexual dimorphism.

The males are distinguished from the females by the possession of three long horns, projecting from the anterior region of the body, of which there are only the faintest indications in the females. The antennules of the male are longer than in the female; other differences will be apparent from the following description of the two sexes.

Description of the Male.—The body is capable of being contracted into a ball as in the genus *Sphæroma*. The head is narrower than the first segment of the thorax and only a very little longer; the dorsal surface is much sculptured. Anteriorly the head is prolonged into a long spine, which is wide and triangular at the base and gradually narrows towards the extremity, becoming slightly thickened just at its extreme end; the spine does not project straight from the head but is curved upwards; it arises from the inferior surface of the head, its posterior extremity being excavated for the upper lip; on the dorsal surface of the head, just above the spine and lying between the antennary appendages, is a deep depression; from the margins of this two ridges, one on either side, pass to the eyes and form the anterior margin of the head; in front and to the inside of the eyes this ridge gives off a strong spine on either side, not more than half the length of the median spine; each of these spines is somewhat curved; the proximal half is

directed forwards and somewhat outwards, it then takes a sudden bend outwards and downwards.

The first segment of the thorax is longer but not wider than any of the succeeding; the dorsal surface is sculptured like the head, but there is an oval median area which is smooth or only faintly pitted; laterally the segment is widened and projects forward below the eyes, as well as backwards; this region of the segment, which corresponds to the epimera, is granulose and covered with hairs; the three following segments are short and subequal, they are smooth dorsally or covered with minute punctulations; the epimera are rounded at their free extremities, granulose and hairy; the fifth thoracic segment has the same structure as the preceding, but the epimera are longer and project a trifle further outwards from the sides of the body; the sixth segment is longer than the preceding, and the seventh slightly longer again; the epimera of the sixth segment are as large as those of the fifth, the epimera of the seventh segment are small, in both cases they resemble the anterior epimera in being granulose and hairy. All the abdominal segments are free, or at least only partially fused; the first segment is represented by a crescentic plate closely applied to the concave posterior border of the seventh segment of the thorax; it is not developed laterally; the second and third segments are fused in the middle line, but become free laterally and are prolonged into epimera; the conjoined segments are extremely short in the middle line but longer laterally; the fourth segment is the longest mesially, but its lateral regions are about equal to any of the preceding segments; the fifth segment is extremely short dorsally, and apparently becomes fused laterally with the preceding segment. The four anterior segments of the abdomen are smooth in the dorsal region, but covered with small rounded tubercles and hairs laterally, like the thoracic segments; the fifth segment is, however, granulose throughout.

The caudal shield is triangular in outline; it terminates posteriorly in a short, stout, pointed process; on the dorsal surface are two prominent lateral convexities; the whole of the dorsal surface of the caudal shield is covered with innumerable rounded tubercles, which become gradually larger towards the summit of the lateral convexities; the anterior region between the two convexities is almost smooth.

The *antennules* articulate with the head by a very broad basal joint, then follows a short and narrow joint; the third and last joint of the peduncle is elongated; the flagellum is nearly as long as the peduncle.

The *antennæ* are enormously elongated, reaching back to nearly the end of the body; they articulate with the head by a very short basal joint; the three remaining joints of the peduncle are long, increasing in length progressively; the flagellum is rather longer than the peduncle and consists of some twenty-eight stout joints.

The *mandibles* are stout, with a slender three-jointed palp.

The *first pair of maxillæ* consists of two lobes; the anterior is the stouter.

Description of the Female.—None of the female specimens at my disposal were so large as either of the two male specimens described above. The body is much smoother, and the sculpturing on the head and first segment of the thorax is entirely absent. In place of the long spines of the male are very faintly marked projections which occupy a similar position.

The segments of the thorax are similar to those of the male and are smooth dorsally, but granulated upon the epimera.

The segments of the abdomen are somewhat differently disposed; the first segment of the abdomen is similar to that of the male; the next three segments, however, form a single piece mesially, but are distinctly separated laterally. The caudal shield is exactly like that of the male.

The antennæ are not quite so long as in the male, but are otherwise similar.

The first abdominal appendage, as in other Isopoda, differs by the absence of the penial filament.

Station 161, off entrance to Port Philip, April 1, 1874; lat. 38° 22′ 30″ S., long. 144° 36′ 30″ E.; depth, 33 fathoms; bottom, sand.

Station 163B, off Port Jackson, June 3, 1874; lat. 33° 51′ 15″ S., long. 151° 22′ 15″ E.; depth, 30 to 35 fathoms; bottom temperature, 63° F.; hard ground.

Cymodocea, Leach.

Cymodocea darwini, Cunningham.

Cymodocea darwini, Cunningham, Trans. Linn. Soc. Lond., vol. xxvii.

This species, first noticed by Cunningham, has been recently fully described by Studer from the same locality, viz., the shores of Patagonia. During the Challenger Expedition several specimens were dredged off Kerguelen Island. This species, therefore, forms another instance of those which are common to Patagonia and Kerguelen.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; depth, 127 fathoms; volcanic mud.

Cymodocea abyssorum, F. E. Beddard (Pl. VII. figs. 6–12).

Cymodocea abyssorum, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 114.

This species is represented by two examples, dredged in 1070 fathoms, off New Guinea.

One of these specimens is a male and the other a female; the male is rather the larger of the two, measuring 14 mm. in length, while the female measures 11 mm.; besides this difference in size the two sexes are to be distinguished by the form of the

uropoda; in the female (fig. 7) the two rami are subequal; in the male (fig. 6) the fixed endopodite is rudimentary, and the exopodite is a long, curved, spine-like joint. It will be noticed that this difference of sex, and in the present specimen it undoubtedly is merely a difference of sex, represents what has been by many regarded as a generic distinction.

Both specimens are of a pale light-brown colour; the surface of the body is more or less tubercular; the general form of the body is characteristic of the genus, except in its extreme flatness; I have represented this in fig. 8, which is a lateral view of the Crustacean.

The head is rather short and is bounded in front by a prominent ridge, which projects in the middle line as a short rostrum; the eyes are rather small and rounded; they are, however, inconspicuous from their white colour.

The first segment of the thorax is larger than any of the following; the five following segments are subequal and are furnished laterally with curved epimera; the epimera of the fourth segment are larger, and those of the last of these segments are more distinctly hooked at their extremity than any of the foregoing. The sixth segment of the thorax is of equal antero-posterior diameter with the preceding segments, its epimera are, however, rudimentary and do not extend nearly so far laterally as the epimera of the foregoing and the following segments.

The abdomen consists of four free segments and a caudal shield; in the female I could not observe more than three free abdominal segments; the first and fourth segments of the abdomen in the female are very short and rudimentary, and have no lateral extension; the two middle segments are distinct from each other dorsally, laterally they are fused and project outwards in a large epimeron, which reaches as far as those of the thoracic segments, but instead of being like them, sickle-shaped with a curved anterior and straight posterior margin, they are square in outline and truncated at the extremity. The antero-lateral regions of the caudal shield are prolonged into epimera of a precisely similar form; the caudal shield is triangular in outline, and has two prominent, blunt, median tooth-like processes situated one behind the other. Inferiorly it is excavated for the reception of the abdominal appendages, the excavation being surrounded by a flattened rim.

The *antennules* are of about equal length with the antennæ but rather more slender; the peduncle has three joints and the joints increase progressively in length, they are smooth; the flagellum is many-jointed and about equal in length to the peduncle.

The *antennæ* have a three-jointed peduncle; the basal joint is long and stout, the second joint of equal diameter, but rather shorter; the third joint is much more slender and about equal in length to the second; the flagellum is multiarticulate and shorter than the peduncle.

The abdominal appendages of the first five pairs have been referred to above (p. 147);

the fourth and fifth are entirely respiratory, as in the genus *Amphoroidea*. This is the case with both sexes.

The *uropoda* in the male (fig. 12) consist of a short fixed endopodite and a long curved exopodite, which is very considerably longer than the caudal shield; in the female (fig. 11) the uropoda are of a different shape; the two rami are subequal; the outer movable ramus is narrower than the inner ramus, which is flattened out and pointed at its extremity.

Station 218, off New Guinea, March 1, 1875; lat. 2° 33′ S., long. 144° 4′ E.; depth, 1070 fathoms; bottom temperature 36°·4 F.; blue mud.

Family Cymothoidæ.

Anuropus, F. E. Beddard.

Anuropus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i. p. 112.

Definition.—Body very convex, smooth, without any hairs or spines. Head small, without any trace of eyes. Thoracic segments subequal, furnished with well-developed epimera except on the first segment, where they are fused with the tergum. Abdomen narrower than thorax; abdominal segments short and subequal, sixth segment larger and rounded, flattened. Antennules very short, consisting of a basal joint and a swollen, elongated, curved, distal joint; antennæ slender and well developed, with a four-jointed peduncle and a flagellum of equal length. Thoracic appendages subsimilar, short and stout, with a powerful terminal claw. Abdominal appendages all similar, consisting of a short basal joint and two expanded foliaceous rami.

Remarks.—This genus is quite the most remarkable that was obtained during the voyage; it is represented only by a single individual from deep water (1070 fathoms) in the Western Pacific, off New Guinea. In its general form there is no marked discrepancy from other genera of Cymothoidæ, to which family the present species is evidently to be referred. The most remarkable divergence in structure, and one which is clearly correlated with its habitat, is the modification of the abdominal appendages of the last pair. One of the principal characteristics of the group Isopoda is the metamorphosis of one or more pairs of the abdominal appendages into respiratory organs; the number of pairs of limbs which are thus modified, and their form, is typical of different families. But in no one genus or family do all the abdominal limbs serve the function of respiratory organs; at least the terminal pair are modified into the rudimentary, styliform or flattened appendages, which latter form together with the extremity of the abdomen a powerful "caudal fin" the principal agent of progression. The present genus, therefore, in that the terminal pair of abdominal appendages are precisely similar to the foregoing limbs, evidently subserving like them the function of respiration, is quite unique not only in the

family to which it belongs, but in the Isopoda generally; it is true that in certain forms (*e.g.*, *Phryxus*) degraded by parasitism, there is a similarity between the abdominal appendages, but such a case does not interfere with the truth of the general statement that has just been made, which only refers to perfectly developed forms.

There is an interesting analogy between the structure of *Anuropus*, as regards its respiratory organs, and that of a deep-sea Isopod lately described by Professor A. Milne-Edwards.[1]

In *Bathynomus giganteus*—a colossal Isopod measuring 9 inches in length—the respiratory organs are very remarkable and unlike anything that has been met with in other Isopoda except in *Cepon* and *Ione*. "It appears," says M. Milne-Edwards, "that the respiratory apparatus of an ordinary Isopod is insufficient to fulfil the physiological needs of *Bathynomus*, and that the development of special organs of a greater functional power has been rendered necessary. The abdominal limbs, which ordinarily in this group constitute the sole branchial apparatus, form in *Bathynomus* a kind of opercular system, beneath which are found the real respiratory organs or branchiæ." These structures are, in fact, represented by a series of branched outgrowths of the abdominal wall, which contain abundant blood spaces, as has been proved by injection. The branched appendages of the genera *Cepon* and *Ione* are quite rudimentary as compared with those of *Bathynomus*.

Now, in *Anuropus* the same need for increased respiratory power has been satisfied in a different way. Instead of the development of accessory branchial organs, as in *Bathynomus*, an additional pair of abdominal appendages have been pressed into service as gills. *Anuropus* is, therefore, more typically Isopodan in structure than *Bathynomus*, and, indeed, presents us with an exaggeration of a character which is common to the group, and forms an important item in its definition.

It is evident from these two instances that there is a need for increased respiratory surface in deep-sea animals, and, not to go into a detailed summary of facts, I may remind the reader that the dorsal processes of some of the curious deep-sea Holothurians described by Dr. Hjalmar Théel are probably analogous. It is well known that the percentage of oxygen is less in the bottom waters than at the surface, and hence has arisen the need to make the most of the failing supply of this gas. I have carefully examined the other Isopoda with a view to discover if there were present any other modifications of a like nature to those which occur in *Bathynomus* and *Anuropus*. In a deep-sea Sphæromid described above under the name of *Cymodocea abyssorum*, the branchial organs are more fully developed than in the majority of species belonging to that family. In the typical Sphæromidæ, as is well known, only the fourth

[1] *Comptes rendus*, January 1879. There is a figure (two-thirds the natural size) of this most remarkable form in a work by M. Filhol, lately published, and entitled La vie au fond des mers; see p. 148 for description.

and fifth pairs of abdominal limbs are respiratory; in the fifth pair both the inner and outer ramus are thin-walled, delicate, much folded lamellæ, in the fourth pair it is only the endopodite of the limb which has this peculiar structure, the exopodite being a flat hard plate which covers over the subjacent lamellæ and serves as a protective operculum. In *Cymodocea abyssorum*, however, the fourth pair of appendages exactly resembles the fifth pair; there is no operculum, both exopodite and endopodite are folded gill-plates. This feature, although it may be correlated with the habitat of the Crustacean, is not so noteworthy, since it occurs in the shallow-water genus *Amphoroidea* according to Milne-Edwards;[1] and I have been able myself to verify his statements by an examination of *Amphoroidea falcifer*, a New Zealand form, which I have had the opportunity of studying through the kindness of Mr. G. M. Thomson.

Possibly the delicate integument of certain deep-sea Munnopsids is a modification brought about by a similar need for increased respiration. In other Isopoda I can detect no obvious evidence which would point to a need for increased respiratory power. This is one of the most puzzling facts about the deep-sea Isopodan fauna, that whereas some forms, such as *Anuropus* and *Bathynomus*, show an evident modification in relation to their habitat, others show no traces of any such modification and are indistinguishable in these respects from shallow-water forms. As in the case of the presence or absence of eyes in the deep-sea Isopoda discussed below (p. 163) it may be that these special modifications indicate a remote period of immigration into deep water.

Anuropus branchiatus, F. E. Beddard (Pl. VII. figs. 1–5).

Anuropus branchiatus, F. E. Beddard, Proc. Zool. Soc. Lond., 1886, pt. i, p. 113.

The single specimen of this species measures 70 mm. in length.

The body is extremely convex, more particularly in the thoracic region.

The head is small and rounded, with a short median rostrum; there is no trace of any eyes; the anterior region of the head is deeply grooved for the insertion of the antennary organs, the ventral margin of the head is ridged below, and in the middle line it is prolonged into an upwardly directed process which exactly corresponds in direction to the rostrum; the two do not, however, meet, but are separated by a space about equal to the basal joint of the antennules.

The thoracic segments increase progressively in length from before backwards up to the sixth; the seventh is a little shorter than the sixth.

All the segments with the exception of the first are furnished with separate epimera.

The abdomen is distinctly narrower than the thorax, the first five segments are subequal; their lateral margins are rounded and overlap, the antero-lateral region of the

[1] Hist. Nat. Crust., t. iii. p. 222, pl. xxxii. fig. 9.

segment being somewhat hollowed for this purpose. The terminal segment of the abdomen, including the telson, is a broad plate almost circular in outline; the anterior region, which represents the tergum of the sixth segment, is convex and marked off from the flattened telson; the latter has a faint median longitudinal carina which is grooved, and there are also a pair of lateral carinæ.

The *antennules* (see fig. 3) are stout and swollen and consist of only two joints; the basal joint is almost spherical and very small, the distal joint is much longer and is slightly curved upwards; it terminates in a pointed extremity.

The *antennæ* have a more normal structure; the peduncle consists of four joints; of these the two first are short and subequal, the third is very long, longer than the two basal joints taken together, the fourth joint of the peduncle is also elongated but shorter than the third; the flagellum is nine-jointed.

The *mandibles* are very powerful appendages; the cutting-edge is chisel-like and coloured of a dark brown; there is a three-jointed palp.

The *maxillæ of the first pair* are not remarkable in their structure; they are two-lobed; the cutting-edge is fringed with stout brown coloured spines.

The *maxillæ of the second pair* are two-lobed.

The *maxillipedes* (see fig. 4) are remarkable on account of their very rudimentary structure; they appear to consist of only two joints; the basal joint, which articulates with the head, is elongated from side to side at its articulation, but narrower distally; the distal joint is smaller, and oval in form; both appendages had the same structure, and I am therefore inclined to think that it is all that is really represented in the species, and that there is nothing defective in the specimen.

The *thoracic appendages* increase in size up to the sixth pair; I am unable to say anything about the size of the seventh pair of limbs, as they were defective.

The first pair of appendages are cheliform; the basal joint is the longest and stoutest, and is grooved on its inferior surface for the reception of the rest of the limb, which can be folded back like the blade of a penknife; the second, third, and fourth joints are very short and decrease progressively in size; the fifth joint is longer, and is oval and swollen; the sixth joint is a comparatively slender spine which can be bent back upon the penultimate joint.

In the second pair of appendages the third and fourth joints are proportionately longer; I am unable to say whether these appendages are chelate, as the distal joints of the limb were missing.

The remaining appendages are not chelate; they differ from the first pair in the greater length of the second, third, and fourth joints, in the extreme slenderness of the fifth joint, and in the minute terminal claw which represents the sixth joint. The basal joint of these appendages is longitudinally excavated as in the case of the first pair.

The *abdominal appendages* are all similar to each other; there is no difference in structure between the last pair and the first.

Each consists (fig. 5) of a short basal joint, with which are articulated two broad foliaceous rami, which have a rounded outer margin and a straighter inner margin.

Station 218, between New Guinea and Admiralty Islands, March 1, 1875; lat. 2° 33′ S., long. 144° 4′ E.; depth, 1070 fathoms; blue mud.

THE ISOPODAN FAUNA OF DEEP WATER.

The following observations on the Isopodan fauna of the deep sea are mainly a recapitulation of the details that have been already given in considering the several families of Isopoda represented in the Challenger collection. It may be useful, however, to bring together these scattered facts, and to compare them with what is already known from the investigations of Sars and others.

Before stating the facts and discussing the various conclusions that may be arrived at from their study, it is evidently necessary to determine what is the boundary line between "shallow" and "deep" water.

In his Report on the Challenger Echinoidea, Agassiz divides the ocean into three territories: (1) littoral, up to about 100 fathoms; (2) continental, to 500 fathoms; and (3) abyssal, all the greater depths.

I do not propose in the present section to consider in detail the littoral forms, but I shall of course indicate those continental and abyssal species which also occur in the shallow waters.

Since so many of the species described by Professor Sars range from extremely shallow water up to 300 fathoms, and since so few (only ten) exceeded those limits, I shall, for the purpose of shortening my Table, commence with the 300 fathoms limit, not including those species that just touch that line. It appears to me, in fact, from a consideration of the bathymetrical distribution of the Isopoda, that the 300 fathoms line marks approximately the boundary between what may be termed deep-sea species and shallow-water species.

BATHYMETRICAL TABLES.

In the following Tables those species which are referred to more than once are marked with a number or series of numbers corresponding to the other tables in which they will be found to occur.

Table I.—300 to 500 fathoms.

Munnopsis typica, Sars, shallow water.
„ *latifrons*, F. E. B.
Eurycope gigantea, Sars, continental; II.
Eurycope cornuta, Sars, shallow water.
Ilyarachna longicornis, Sars, shallow water.
Anceus hirsutus, Sars, continental.

Anceus robustus, Sars, continental.
Arcturides cornutus, Studer, shallow water.
Arcturus baffini, Westwood, shallow water.
„ *hystrix*, Sars.
„ *tuberosus*, Sars.
„ *purpureus*, F. E. B.
„ *cornutus*, F. E. B.
Astacilla granulata, Sars, shallow water; II.
Janira laciniata, Sars.
Trichopleon ramosum, F. E. B.
Typhlapseudes nereus, F. E. B.
Cryptocope vöringii, Sars; II.
Paranthura norvegica, Sars, shallow water.
Serolis antarctica, F. E. B.; III.
„ *bromleyana*, F. E. B.; II., III.
Acanthoniscus typhlops, Sars.
Nannoniscus bicuspis, Sars, continental; II., III.

TABLE II.—500 to 1000 fathoms.

Eurycope atlantica, F. E. B.
„ *gigantea*, Sars, continental; I.
Arcturus spinifrons, F. E. B.
„ *anna*, F. E. B.
„ *myops*, F. E. B.
Astacilla granulata, Sars, shallow water; I.
Stenetrium haswelli, F. E. B.
Ischnosoma quadrispina, Sars.
Anceus bathybius, F. E. B.
„ *stygius*, Sars; III.
Paranthura chiltoni, F. E. B.
Nannoniscus bicuspis, Sars, continental; I
Cryptocope vöringii, Sars; I,
Acanthomunna proteus, F. E. B.; III.
Serolis neæra, F. E. B.; IV.
„ *gracilis*, F. E. B.
Bathynomus giganteus, M.-E.

TABLE III.—1000 to 2000 fathoms.

Munnopsis gracilis, F. E. B.
„ *australis*, F. E. B.
Eurycope sarsii, F. E. B.
„ *novæ-zelandiæ*, F. E. B.
„ *spinosa*, F. E. B.
„ *fragilis*, F. E. B.
„ *pellucida*, F. E. B.
Acanthocope spinicauda, F. E. B.
„ *acutispina*, F. E. B.
Arcturus furcatus, Studer, shallow water.
„ *glacialis*, F. E. B.
„ *spinosus*, F. E. B.
„ *brunneus*, F. E. B.
„ *abyssicola*, F. E. B.; IV.
Iolanthe acanthonotus, F. E. B.
Janira abyssicola, F. E. B.
Ischnosoma bacillus, F. E. B.
„ *bacilloides*, F. E. B.
„ *spinosum*, F. E. B.
Leiopus leptodactylus, F. E. B.
Serolis antarctica, F. E. B.; I.
„ *bromleyana*, F. E. B.; I., II.
Sphyrapus serratus, Norman.
Neotanais americanus, F. E. B.
Cymodocea abyssorum, F. E. B.
Acanthomunna proteus, F. E. B.; II.
Anuropus branchiatus, F. E. B.
Anceus stygius, Sars.
Glyptonotus megapterus, Sars.

TABLE IV.— 2000 fathoms and upwards.

Eurycope abyssicola, F. E. B.
„ *intermedia*, F. E. B.
Arcturus abyssicola, F. E. B.; III.
Bathytanais bathybrotes, F. E. B., shallow water.
Typhlotanais sp., F. E. B.
„ *brachyurus*, F. E. B.
Serolis nexra, F. E. B.; II.

It is clear from the above tables, that as the depth increases there is less similarity between the Isopodan fauna, and that of shallow water.

In Table I., from 300 to 500 fathoms, there are twenty-three species recorded; of these no less than eleven or nearly one-half also range into shallow water, in many instances into such insignificant depths as 50 fathoms; six of these species on the other hand are also found in greater depths, but of these six, only three extend into the shallower regions of the ocean; nine are peculiar.

In Table II., from 500 to 1000 fathoms, there are seventeen species; three of these are found both in Table I. and in shallow water, and another is found in Table I. but not in shallow water, three other species range into greater depths; ten are peculiar to depths of from 500 to 1000 fathoms.

In Table III., from 1000 to 2000 fathoms, there are twenty-nine species, of which, however, five were dredged in water of from 1000 to 1070 fathoms, and therefore only just fall within the limits assigned. Only a single species is also an inhabitant of shallow water; three range into less depths, and one into greater depths.

In Table IV., there are seven species, of which four only exceed by a few fathoms the limits assigned to this table, two range into less depths, another (perhaps two) into shallow water, while three are only to be found in this table.

In passing from the lesser to the greater depths, there is evidently, as has been stated above, a decreasing number of species that are common to these depths and to shallow water; but it is impossible to draw an absolute line of division which would separate an abyssal from a shallow-water fauna; the two overlap each other throughout; it may be safely stated, however, that the greater the depth at which a given Isopod occurs, the less chance there is of its being also an inhabitant of shallow water and *vice versâ*. It will also be seen from the above tables that the largest number of deep-sea species occur in Table III., that is, in depths of from 1000 to 2000 fathoms, and of these species twenty-four are peculiar to that zone, including six distinctive genera. In the very great depths there is a great falling off in the number of species.

There is no trace of any zone that is without its Isopod fauna; from 345 fathoms up to 2740 fathoms species were dredged continuously; there is nowhere a break of more than 100 fathoms.

From the tables I may also deduce a list of abyssal genera, which is as follows :—

Munnopsis.†
Eurycope.†
1 *Acanthocope.*
Arcturus.†
Glyptonotus.†
Astacilla.†
Stenetrium.†
Janira.†
2 *Anuropus.*
3 *Bathynomus.*
Serolis.†
Ischnosoma.†
4 *Acanthomunna.*
5 *Trichopleon.*
Nannoniscus.
6 *Iolanthe.*
Paratanais.†
Typhlotanais.†
7 *Sphyrapus* (?)
Cryptocope.†
8 *Neotanais.*
9 *Leiopus.*
Paranthura.†
Cymodocea.†
Anceus.†
Neasellus.

The above list includes all those genera that are found in depths of 500 fathoms and more. Those that are marked with an asterisk (*) are also found in the continental zone, while those to which a dagger (†) is appended are found in the littoral zone. It appears, therefore, that the nine numbered genera are, as far as at present known, absolutely confined to deep water. This table, however, does not indicate those genera that are characteristically abyssal, that is those in which the majority of species inhabit the greatest depths; *Ischnosoma* is characteristically a deep-sea form; only one species (*Ischnosoma bispinosum*) is found in shallow water up to 300 fathoms; the remaining four species are all inhabitants of very deep water. In the genus *Eurycope* about one-half of the known species are abyssal; two of the four species of *Munnopsis* are abyssal, and very nearly all the species of the genus *Arcturus*. On the other hand, *Cymodocea*, *Astacilla*, *Stenetrium*, *Janira*, *Paranthura*, *Typhlotanais*, *Cryptocope*, and *Paratanais* are genera which are almost exclusively confined to the littoral area, one species only of each (two of *Typhlotanais*) descending into the great depths; of the remaining genera, *Glyptonotus* and *Nannoniscus*, only two species of each are at present known, so that it is hardly worth while drawing attention to the fact that they are equally distributed in the greater and lower depths. *Anceus* has two abyssal species and a very large number of shallow-water forms; of *Serolis* four species (25 *p. c.*) range into the abyssal waters.

The only species known to me which are common to the abyssal and littoral region are—

Arcturus furcatus, a few fathoms and 1675 fathoms,
Bathytanais bathybrotes, a few fathoms and 2050 fathoms,

though as already mentioned a great number of species are common to the littoral and

continental zone. Only six species are common to the continental and abyssal zone; these are—

Nannoniscus bicuspis, 191–1163 fathoms.
Eurycope gigantea, 260–658 fathoms.
Cryptocope vöringii, 350–778 fathoms.
Astacilla granulata, 290–620 fathoms.
Serolis antarctica, 400–1600 fathoms.
Serolis bromleyana, 410–1975 fathoms.

The Isopod fauna of the abyssal regions may therefore be said to be fairly distinct from that of the shallower waters, since it includes nine distinct genera besides a number of others which are characteristic, and since only seven species out of a total of forty-two ascend into less depths. Of the nine peculiar genera, two, viz., *Bathynomus* and *Anuropus*, are certainly to be regarded as the types of subfamilies.

The continental region, including depths of 100 to 500 fathoms, includes the following genera :—

*Munnopsis.**†
*Eurycope.**†
*Ilyarachna.**
*Desmosoma.**
*Arcturus.**†
*Astacilla.**†
*Anceus.**†
*Serolis.**†
*Janira.**†
*Jæropsis.**
*Munna.**
Nannoniscus.†
*Pleurogonium.**
*Ischnosoma.**†
*Macrostylis.**
*Synidothea.**
*Acturides.**
*Paranthura.**†
*Æga.**
*Apseudes.**
1 *Typhlapseudes.*†
2 *Astrurus.*
Neasellus.
*Paratanais.**
*Typhlotanais.**†
*Tanais.**
*Leptognathia.**
*Cymodocea.**
3 *Acanthoniscus.*
*Cryptocope.**†

There are only three peculiar genera, the remaining twenty-seven being found in shallower water, and in the abyssal region; the asterisk (*) indicates those that are also found in shallow water, the dagger (†) those that extend their range into the abyssal zone; fourteen range into both these regions, one genus, *Nannoniscus*, is only found in deeper water, while the remaining eleven range only into the shallower depths.

I cannot pretend to give anything like a complete list of the shallow-water genera,

because in many cases, particularly among the Sphæromids, carcinologists are by no means agreed as to the limits of particular genera. The following genera, however, among others, appear to be, as far as is at present known, peculiar to the littoral zone :—

Asellus.	*Anthura.*
Jæra.	*Haliophasma.*
Paramunna.	*Sphæroma*, and allied genera.
Dendrotion.	*Ceratocephalus.*
Idothea, and other allied genera.	Many genera of Cymothoidæ.

At any rate it may be safely stated that there are more genera peculiar to the littoral zone than either to the continental or abyssal; the continental zone is evidently a transitional area combining to a certain extent the characters of the abyssal and littoral zones, its own special peculiarities being but feebly marked. Seeing, however, that out of the thirty genera assigned to this region, twenty-five are also found in shallow water, and only fourteen in deeper water (thirteen of these being genera which are also found in shallow water), it appears to me to be almost unnecessary to regard this transitional zone in considering the bathymetrical distribution of the Isopoda. The older division of the marine fauna into two sections, the deep-sea fauna and the shallow-water fauna, fixing the limit between them at about 300 fathoms, appears to me to meet the requirements of the case. All the abyssal genera which are found in shallow water at all are met with in depths of less than 100 fathoms, with the sole exception of *Nannoniscus*, which, being only represented by a single species, cannot be considered to form an important exception. Looking at the matter from this point of view, we shall have eleven peculiar genera of the abyssal fauna, and only four species out of sixty-five which are common to this zone and to the shallower waters.

Mr. John Murray and M. Renard have lately expressed the opinion that "dredgings near the shores of continents in depths of 1000, 2000 or 3000 fathoms are more productive, both in species and individuals, than dredgings at similar depths several hundred miles seaward"; and also that "among the few species dredged in the abyssal areas furthest removed from land, the majority show archaic characters, or belong to groups which have a wide distribution *in time* as well as over the floor of the present oceans." It will be interesting to see how far these conclusions, deduced from a study of other deep-sea invertebrata, are applicable to the Isopoda. With regard to the first question, I find on reference to the list of deep-water forms of Isopoda that there are twenty-five that were dredged in the neighbourhood of continental land, and twenty-two at a long distance from any continental land, though most frequently in the vicinity of land, *e.g.*, at Kerguelen, while four species are found in both habitats. As regards number of species, therefore, the distribution of the deep-sea Isopoda does not lend any strong support to

the above quoted opinion, though it does not on the other hand render it inapplicable to this group. So very few of the deep-sea species of Isopoda were dredged in any numbers that I cannot say much respecting the number of individuals in the neighbourhood of continents as compared with the number dredged at Stations far distant from any continent; such facts as are at my disposal do not indicate any very marked distinction in this respect; *Eurycope novæ-zelandiæ*, *Serolis bromleyana*, *Serolis neæra*, *Serolis gracilis*, *Typhlapseudes nereus*, and *Arcturus myops*, are represented by a considerable number of individuals, and all these species frequent the neighbourhood of continents; on the other hand, *Eurycope sarsii*, *Arcturus spinosus*, *Arcturus brunneus* and *Leiopus leptodactylus* are true "abyssal" forms, and are also comparatively abundant in individuals. Here again the balance of evidence supports Messrs. Murray and Renard, but not in a striking way.

With regard to the supposed archaic character of the deep-sea fauna the facts at my disposal do not permit of any positive statements.

GEOGRAPHICAL DISTRIBUTION OF DEEP-SEA ISOPODA.

One of the most important results of the recent explorations of the deep sea has been to show that it is impossible to mark out any definite regions of the ocean comparable to the terrestrial distributional provinces; the same genus, and even the same species, is often represented by individuals in the most widely separated areas; and this is explained by the similar conditions which must obtain at great depths in all parts of the ocean. Among the Isopoda no great stress can be laid upon the occurrence of the same genus in regions of the ocean widely remote from each other, because among the shallow-water forms many, not to say most genera, are universally distributed; more important results can evidently be attained by considering the distribution of particular species rather than genera. Bearing in mind the very limited knowledge, comparatively speaking, which we at present have of the deep-sea fauna, the occurrence of five species over a wide tract of the earth's surface is more important than it would appear to be if we judged only by percentages.

The most widely distributed species is *Eurycope fragilis*, which ranges from the North Pacific, near to Japan, as far south as lat. 60° S., close to the Antarctic ice-barrier, and to the neighbourhood of the Crozets.

Two species of *Serolis*, viz., *Serolis antarctica* and *Serolis bromleyana*, have been referred to in the first part of my Report as having a wide horizontal distribution; the former was dredged off the coast of South America, just under the equator, and again in the neighbourhood of the Crozets; the latter ranges from off the coasts of New Zealand and Australia to the vicinity of the Antarctic continent. *Neotanais americanus* inhabits regions so far removed as Station 45, off New York, and Station

323, off Buenos Ayres. *Arcturus abyssicola* was dredged in the western limits of the Pacific, off North Australia, and in the middle of that ocean near to the Low Archipelago. I might add to this list *Ischnosoma bacillus*, dredged between Australia and Kerguelen, which is represented by a very closely allied if not identical species, *Ischnosoma bacilloides*, at Station 302, off the east coast of South America, and also *Eurycope atlantica*, dredged in the North Atlantic, which has at least a close ally in a species obtained near the Crozets. It is hardly worth while to refer to species which were dredged so near to each other as Stations 146 and 147, or Stations 168 and 169.

The following is a list of the Stations at which deep-sea Isopoda were met with :—

Station 23. *Arcturus purpureus, Typhlapseudes nereus.*
Station 45. *Neotanais americanus.*
Station 68. *Eurycope abyssicola.*
Stations 76, 78. *Anceus bathybius, Eurycope atlantica.* / *Ischnosoma spinosum, Leiopus leptodactylus.*
Stations 120, 122. *Serolis gracilis.* / *Serolis antarctica.*
Station 146. *Eurycope sarsii, Serolis antarctica, Arcturus spinosus.*
Station 147. *Eurycope sarsii, Serolis antarctica, Eurycope atlantica* (?), *Munnopsis australis, Eurycope fragilis, Arcturus brunneus.*
Station 152. *Eurycope fragilis.*
Station 153. *Arcturus furcatus, Arcturus glacialis, Iolanthe acanthonotus.*
Station 156. *Serolis bromleyana.*
Station 157. *Eurycope spinosa.*
Station 158 *Eurycope fragilis Acanthocope spinicauda, Ischnosoma bacillus.*
Station 168. *Munnopsis gracilis, Eurycope novæ-zelandiæ, Serolis bromleyana. Acanthomunna proteus.*
Station 169. *Serolis bromleyana, Acanthomunna proteus, Arcturus myops, Paranthura chiltoni.*
Stations 174, 175. *Arcturus spinifrons.* / *Janira abyssorum.*
Station 184. *Arcturus abyssicola.*
Station 214. *Trichopleon ramosum.*
Station 218. *Eurycope pellucida, Anuropus branchiatus, Cymodocea abyssorum,*
Stations 232, 237. *Munnopsis latifrons.* / *Eurycope fragilis.*
Station 246. *Typhlotanais abyssorum, Typhlotanais* sp., *Bathytanais bathybrotes.*
Station 252. *Eurycope intermedia.*

Station 281. *Arcturus abyssicola.*
Station 302. *Acanthocope spinicauda, Ischosoma bacilloides.*
Station 318. *Serolis neæra.*
Station 320. *Serolis neæra, Stenetrium haswelli, Arcturus americana.*
Station 323. *Neotanais americanus.*

It appears from the above list that the deep-sea Isopoda are distributed very unevenly over the floor of the ocean, and that there are long stretches of ocean where no species at all were found; these are the whole of the Central and Southern Atlantic, and the Central and Western Pacific.

I have bracketed together those Stations which are only separated by a very short interval, and this will show that, in most instances where Isopoda were met with, they were represented by a considerable variety of forms. More particularly to be noticed are Stations 146 and 147, Stations 168 and 169, Station 153, Station 158, Station 218, Stations 320 and 323, and Station 246.

The accompanying map illustrates the distribution of the deep-sea Isopoda.

SPECIAL PECULIARITIES OF THE DEEP-SEA ISOPODA.

It has been long known that the deep-sea Crustacea, as well as other deep-sea animals, are commonly blind, but the puzzling fact that this is by no means universally the case has exercised the ingenuity of naturalists; the well-known theory of abyssal light has been brought forward as an explanation of the persistence of eyes in certain forms.

Among the Isopoda thirty-four of the deep-sea species are totally blind, and three others, viz., one species of *Eurycope* and two of *Ischnosoma*, only represented by fragments, may in all probability be added to this list; in four species, viz., three species of *Serolis*[1] and *Cymodocea abyssorum*, the eyes are evidently degenerate; in eighteen species, on the other hand, there are well-developed eyes.

The significance of these facts, however, is not apparent from the statistics; they will require to be examined more closely. In the first place, it is noteworthy that of the eleven peculiar deep-sea genera only two, viz., *Acanthomunna* and *Bathynomus*, have eyes; of the remaining species, seven belong to genera of which the shallow-water representatives, so far as is known at present, invariably possess eyes;[2] these two series of facts are evidently of considerable importance.

On the other hand, the remaining eighteen, included in the genera *Munnopsis*, *Eurycope*, *Ischnosoma*, *Typhlotanais*, and *Cryptocope*, belong to genera which are invariably blind, even when occurring in quite shallow water; the significance of these

[1] See Part I. of my Report, Zool. Chall. Exp., pt. xxxiii.
[2] This includes those species with imperfect eyes, evidently on the way to disappearance.

facts is therefore not so great. Although the number of deep-sea species which have well-developed eyes is so large, they nearly all (all except three) belong to the two allied genera *Arcturus* and *Astacilla*, which thus form almost the only exception to the general statement that the deep-sea Isopoda are blind. It must not be forgotten that certain genera, *e.g.*, *Pleurogonium*, which are confined to shallow water are blind.

It is extremely difficult to conceive of any reason for this great difference. Why should the species of one genus retain their eyes after migrating into the deeper waters while the species of another genus lose them? Possibly the explanation of these anomalies is to be sought for in considering the length of time that has elapsed since the migration of the different species into the abyssal regions of the ocean.

It will be, I hope, apparent to any one who has studied that portion of this Report which deals with the description of species, that the peculiar deep-sea genera are well marked as such, and it may be supposed, therefore, that they are old inhabitants of the deeper waters, consequently they have had time to lose their eyes; on the other hand, the deep-sea *Arcturi* are not widely different from their shallow-water allies, and perhaps therefore have only recently become a part of the abyssal fauna; these two assumptions appear to me justifiable, but it is, on the other hand, evidently a pure assumption to suppose that the deep-sea species of *Janira*, *Serolis*, &c., have been just sufficiently long inhabitants of the deep for the eyes to have become rudimentary or to have disappeared.

It is commonly stated that the deep-sea fauna comprises many species which are larger than their shallow-water representatives. This is certainly the case with the Isopoda. I need hardly allude to the appropriately-named *Bathynomus giganteus*,[1] which is by far the largest species of the order at present known; there are no other instances of deep-sea Isopoda which attain to so colossal a size, but in many families the deep-sea forms are decidedly larger than the shallow-water. Among the Asellidæ, *Stenetrium haswelli* is larger than any of the three shallow-water species of this genus; *Iolanthe* is a large Isopod compared with the size which other Asellidæ reach; the deep-sea species of *Eurycope* are in many cases much larger than the species known to inhabit the shallow water, and I have already referred to the large size of two at least of the deep-sea species of the genus *Serolis*. Many of the deep-sea *Arcturi* are of large size, but, on the other hand, certain shallow-water forms, such as *Arcturus baffini* and *Arcturus furcatus* are fully as large; it must be noted, however, that both these species range into deep water. Two deep-sea species of *Ischnosoma*, viz., *Ischnosoma bacillus* and *Ischnosoma bacilloides*, are very much larger than the single species, *Ischnosoma bispinosum*, which is known from shallow water.

A very noticeable feature in the organisation of the deep-sea Isopoda is the extremely great development of spines upon the body; this character is found in very many of the different families which inhabit the deeper waters. The deep-sea *Arcturi* are more

[1] See p. 152.

particularly noticeable. Among the species enumerated above, *Arcturus spinosus*, *Arcturus glacialis*, *Arcturus purpureus*, and *Arcturus brunneus* are clad with extremely long spines, while the same development is found, though in a less degree, in *Arcturus anna* and *Arcturus spinifrons;* only three deep-sea species out of the ten dredged by the Challenger are unprovided with spines.

The family Munnopsidæ are quite as characteristically a part of the deep-sea fauna as the genus *Arcturus*, but they do not exhibit this peculiarity to anything like so marked a degree. There is only one species which is distinguished by the presence of numerous spiny outgrowths of the integument, viz., *Eurycope spinosa*, though in many others, such as the genus *Acanthocope*, the species *Eurycope fragilis* and *Eurycope atlantica*, the epimera and a single row of spines along the back are unusually developed.

In my account of *Serolis* I have referred to the length and spiny characters of the epimera in three out of the four deep-sea species, which contrasts very markedly with the flattened, sickle-shaped epimera of those species which inhabit the shore.

The characters of the deep-sea Asellidæ bear out the general truth of what has been said above respecting the Isopodan fauna of the deep sea. The genera *Acanthoniscus*, *Acanthomunna*, and *Iolanthe* are quite as remarkable for the development of spines as many of the deep-sea *Arcturi*.

This modification of structure is not, however, confined to the deep-sea species; it is found in quite as marked a degree in *Arcturus furcatus* and *Arcturus studeri* and in other species of the genus *Arcturus;* it will be noticed, however, that these species are inhabitants of the colder regions, and, indeed, it would appear that there is some connection between temperature and the development of spines upon the body. It is more or less true in other groups of the Crustacea that the very spiny forms are either deep-sea, or, if shallow-water, are from the Arctic or Antarctic shores, where the conditions of temperature are not so widely different.

APPENDIX.

Additional Note on Typhlotanais brachyurus.

I have already (*supra*, p. 123) described this Isopod from three specimens dredged at Station 246, which were mounted on a slide during the expedition. I have since received a number of other specimens found during the examination of the deposit from the same locality, which agree in structure with the first received specimens, and must be referred to the same species. The latter specimens were in every case enclosed in a tube averaging about 14 mm. in length; the animals themselves are considerably shorter than the tube which they inhabit, and were usually found at one end where the base of the tube is rather narrower than at the other end. The tube is shaped somewhat like the shell of *Dentalium*, being slightly curved, and narrower at one extremity than the other.

The tubes are of a darkish brown colour and are very tough; they are composed of fine mud, enclosing larger particles, and occasionally, on the outside, shells of *Globigerinæ*; the mud is compacted together by a tough secretion which seems to have no structure. When the Crustacean is extracted by cutting up the tube longitudinally its cut edges become folded in. It is possible that the tube is not manufactured by the Crustacean but has been originally formed by some Annelid. Against this supposition may be urged the fact that the tubes were more or less uniform in size, and were exactly fitted to the elongated body of the Crustacean, the wider anterior portion serving to render the movements of the chelipedes possible, and also to lodge the wider cephalothorax; the tapering form of the tube in fact corresponds to the tapering form of the Isopod. Moreover the formation of a tube-like dwelling is known to occur in other Tanaids as well as in many Amphipoda. There is a general account given in Bronn's Klassen und Ordnungen des Thierreichs[1] of the tube dwellings of certain Tanaids and Amphipoda, to which reference may be made for information on the subject.

Ischnosoma thomsoni, n. sp.[2] (woodcut, fig. 1).

The single specimen of this species measures 6 mm. in length; it is a male.

The anterior region of the body, comprising the head and first four segments of the

[1] Bd. v. Abth. ii. Lief. 16, 17, p. 435.

[2] Named after Mr. G. M. Thomson, well known for his work among the New Zealand Crustacea, particularly Isopoda.

thorax, is considerably shorter than the posterior region, the proportion being about $7\frac{1}{2} : 11$; the anterior part of the body is also rather broader.

The *head* is rather shorter, and narrower than the first segment of the thorax; its dorsal surface is convex and comparatively smooth; the lateral margins of the head are

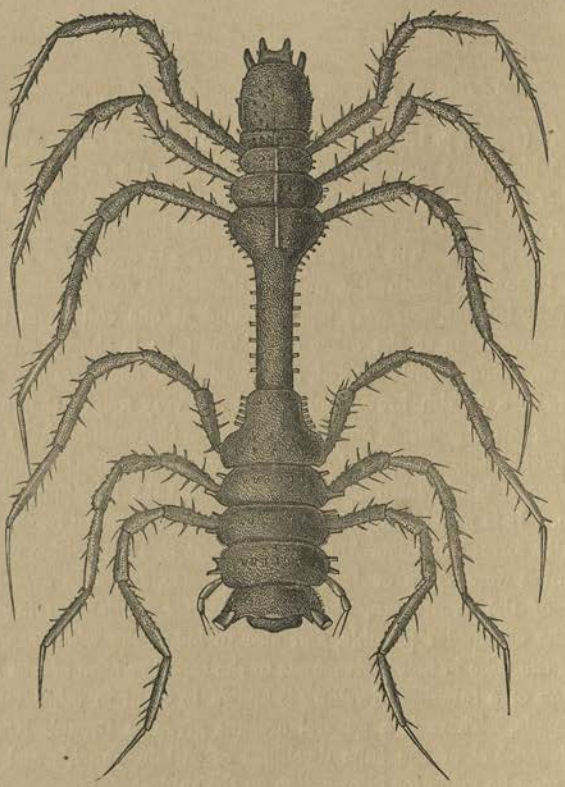


FIG. 1.—*Ischnosoma thomsoni*, n. sp.

deeply notched for the insertion of the basal joint of the antennules. The anterior margin is rounded and convex in the middle line. Eyes are completely absent as in all other species of this genus.

The three first segments of the thorax are approximately equal in size, the second being a trifle shorter than either of the other two. The dorsal surface of these segments

is convex and roughened by numerous minute tubercles; towards the posterior boundary of each segment is a single row of short blunt spines. The lateral regions of the segments have four projecting spines on each side, which are arranged in pairs one above the other; the most anterior and dorsal of these spines is in every case the larger; the spines are blunt and comparatively short.

The fourth segment of the thorax has the form characteristic of other species of this genus; it is wider anteriorly than posteriorly; the anterior part of the segment is as wide as the foregoing segments, while the posterior part is of the same diameter as the extremely elongated and narrow fifth segment; the dorsal surface is furnished with a single row of short tubercles near to its posterior margin, and also a few tubercles scattered over the anterior region. Along the lateral margin of the segment are about eight spines, similar to those which fringe the lateral margins of the anterior segment.

The fifth segment of the thorax is as long as the four anterior segments taken together; the anterior part of the segment is elongated and narrow, the whole segment resembling in shape the corresponding segment in other species of the genus. Along the lateral margin is a row of about sixteen blunt spines, which pass uninterruptedly from one end of the segment to the other; there is also a double row of similar but less numerous tubercles on the dorsal surface; the dorsal and lateral tubercles are of about the same size and about equal in length to the dorsal tubercle of the preceding segments. The hinder part of the segment has a median longitudinal ridge, which is continued on to the succeeding segments of the thorax.

The sixth and seventh segments are very short and subequal in antero-posterior diameter; the breadth of the sixth segment is somewhat less than that of the posterior part of the fifth segment; the seventh segment is narrower still. The anterior margin of the segments is convex, the posterior margin concave. The dorsal region of the segment is beset with a few scattered tubercles, and the lateral margins have also a number of short spines which are like those of the fifth segment, and much shorter than those upon the three first segments.

The *abdomen* is oval in form, and, as in other species, provided with a median convexity which runs nearly to its extremity. The anterior part of the abdomen is separated off from the rest and forms a distinct free abdominal segment. This segment is divided from the rest of the abdomen by a notch on either side, in front of which is a pair of short spines. The lateral regions of the abdomen have on either side three short spines, one being placed just in front of the point of articulation of the uropoda. The abdomen terminates a little way behind the uropoda in a bifurcate extremity, as shown in the accompanying figure (woodcut, fig. 1).

There are no traces of the *antennules* or *antennæ*, except the large basal joint of the former appendages.

The *thoracic appendages* are very similar to those of *Ischnosoma spinosum*, the joints

being furnished as in that species with numerous slender spines inserted on tubercular projections of the limb.

The *uropoda* consist of a single short conical joint.

This species is evidently more nearly allied to *Ischnosoma spinosum* than to either of the two species, *Ischnosoma quadrispinosum* and *Ischnosoma bispinosum*, described by Sars. It agrees with the former species in the great development of spines upon the lateral regions of the thoracic segments. The specimen described here is a male, and it is therefore possible that it is really the male of *Ischnosoma spinosum*. So little is at present known with respect to this interesting genus, all the species having been described from single specimens, that it is impossible to settle this point. For the present I shall regard this species as distinct.

The points in which it differs from *Ischnosoma spinosum* are very numerous. In the first place the fifth segment of the thorax is relatively as well as actually longer than in that species. The lateral spines of the thoracic segments are much longer, as well as more slender, and sharper at their extremities in *Ischnosoma spinosum* than in *Ischnosoma thomsoni;* similarly the spines upon the thoracic appendages are better developed in the former than in the latter species; on the other hand, the fourth segment has a row of lateral spines in *Ischnosoma thomsoni* which are absent in *Ischnosoma spinosum*. The head is considerably smaller in proportion in *Ischnosoma spinosum*, and the tuft of short spines placed anteriorly to the antennules, which are characteristic of that species, are wanting in *Ischnosoma thomsoni*.

The most salient difference between the two species is, however, in the form of the abdominal shield and the uropoda.

In *Ischnosoma spinosum* the posterior extremity of the caudal shield is truncated, and the uropoda, which are curved and cylindrical in form, with a pointed extremity, project beyond it.

In *Ischnosoma thomsoni* the abdomen ends in a prominent bifurcate extremity, and the uropoda, which are more flattened, do not reach nearly as far as the extremity.

In the former species there are a pair of very short spines (omitted in my previous description, but illustrated in the figure) at the end of the abdomen, but these are similar to the spines upon the thoracic limbs, being clear and transparent, and fixed on a short projection of the calcareous integument.

The occurrence of this species at Station 246 extends the range of the genus into the North Pacific; the depth is greater than that which the genus has been previously known to inhabit.

Station 246, July 2, 1875; lat. 36° 10′ N., long. 178° 0′ E.; depth, 2050 fathoms; bottom temperature, 35°·1 F.; bottom, Globigerina ooze.

Macrostylis, Sars.

Macrostylis, Sars, Forhandl. Vidensk. Selsk., 1863.

A single specimen, dredged in 2050 fathoms at Station 246, appears to be referable to this genus, which is defined by Sars as follows:—

"Body narrow, tapering posteriorly. Head large, the frontal margin projecting between the antennæ. Antennules also very short, antennæ long, the flagellum shorter than the base. Mandibular palp absent. The two first thoracic segments short; the third much larger; the fourth with pointed lateral processes; the fifth, sixth, and seventh segments of equal size, separated by deep lateral incisions and with pointed lateral processes. The two first pairs of ambulatory limbs short, with a strong terminal claw; the third larger and very powerful, with the joints expanded and furnished with numerous spines; the fourth pair again small and slender; the fifth to the seventh pairs with the joints hardly dilated, increasing progressively in length. Abdomen large, swollen in the middle, terminating in a blunt extremity. Uropoda long and slender, simple, two-jointed, the terminal joint short.

The occurrence of this genus in very deep water is another instance of the range of Arctic littoral genera into deep water (see p. 159).

Macrostylis latifrons, n. sp. (woodcut, fig. 2).

The single specimen of this species measures 5 mm. in length. The shape is cylindrical, slightly wider at the anterior than at the posterior extremity.

The *head* is separated from the first thoracic segment by a very marked constriction; in general shape it is semicircular, the anterior margin being convex, the posterior straight. The postero-lateral angles are very sharp.

The *thorax* consists of the usual seven free segments; of these the first three are so closely united together that they appear on a superficial examination to be absolutely fused; this, however, is not the case. The first two segments are subequal, with concave anterior and convex posterior border; the anterior border is exactly parallel to the posterior in both segments; the lateral margin of the segments is perfectly straight, parallel to the long axis of the body, and there is hardly any notch between the successive segments. The third thoracic segment is larger than either of the foregoing; its concave anterior border follows closely the convex posterior border of the segment in front; the posterior border of the third segment is straight.

The fourth segment of the thorax is separated from the third by a deep lateral notch, as are also the remaining segments from each other. The fourth segment is rather shorter than any of the succeeding, but a little longer than either of the two first; its anterior and posterior margins are approximately straight and parallel to each other.

The three remaining segments are subequal; the anterior part of the segment is narrow and forms a constricted portion, connecting the segment with the one in front; the lateral regions are wider posteriorly, and their lateral margin slopes outwards and backwards; the postero-lateral angle of each segment is furnished with a short sharp spine.

The *abdomen* is elongated, and slightly wider anteriorly than posteriorly; it is separated by a constriction from the segment in front. The abdomen terminates posteriorly in an obtusely rounded extremity, in front of which, on each side, is the

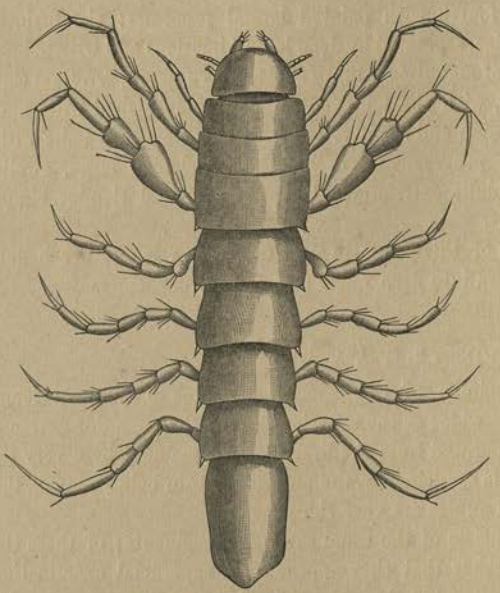


FIG. 2.—*Macrostylus latifrons*, n. sp.

articular surface of the uropoda. The length of the abdomen is about equal to that of the two preceding segments of the thorax. Its lateral margins are smooth. *Eyes* are completely absent.

The *antennules* are articulated close to the antennæ on the antero-lateral margin of the head; the appendages are very short, being about one-half the diameter of the head itself at the point where they are articulated. The basal joint is the stoutest, and there are five joints altogether, of which three may be allowed to the flagellum; the distal joints are very much more slender than the proximal. The terminal joint bears a single olfactory hair.

The *antennæ* are broken off short on both sides of the body.

The *mandibles* appear to be without a palp.

The *thoracic appendages* agree with the generic description given above. The abdominal appendages are covered over by the operculiform first pair, which form a single plate as in allied forms.

The *uropoda* are entirely wanting.

Station 246, July 2, 1875; lat. 36° 10′ N., long. 178° 0′ E.; depth, 2050 fathoms; bottom temperature, 35°·1 F.; bottom, Globigerina ooze.

ADDITIONAL NOTE.

Besides the new species described in this Report there are a few Parasitic Isopoda, which I have not had time thoroughly to investigate and which may or may not be new to science. These are for the most part Bopyrids parasitic under the carapace of both Schizopods and Decapods, and a few have been referred to by Professor Sars in his Report on the Schizopoda, already published.

One species, apparently belonging to the genus *Hemioniscus*, was found in the larval stage attached to *Serolis cornuta*, on the dorsal surface of some of the anterior segments. It is, I believe, a rare occurrence to find an Isopod parasitic on an Isopod, at any rate only one instance is mentioned in Bronn's Klassen und Ordnungen des Thierreichs, where a full list of the parasitic forms and their distribution is given.

TABLE OF CONTENTS.

	PAGE
PREFACE,	1
DESCRIPTIONS OF GENERA AND SPECIES,	3
Asellidæ,	5
Janira,	5
abyssicola,	6
tristani,	6
Stenetrium,	8
haswelli,	9
Ianthe,	13
Ianthopsis,	15
Iolanthe,	15
acanthonotus,	16
Jæra,	18
pubescens,	19
Jæropsis,	20
marionis,	20
Trichopleon,	21
ramosum,	22
Munna,	24
maculata,	25
pallida,	26
Pleurogonium,	27
albidum,	28
serratum,	30
minutum,	32
Neasellus,	33
kerguelenensis,	34
Astrurus,	36
crucicauda,	37
Ischnosoma,	39
spinosum,	40
bacillus,	42
bacilloides,	45
Acanthomunna,	47
proteus,	47
Munnopsidæ,	50
Munnopsis,	50
Munnopsis gracilis,	51
australis,	53
latifrons,	56
Eurycope,	58
sarsii,	58
novæ-zelandiæ,	61
fragilis,	63
atlantica,	66
sp.,	68
spinosa,	68
intermedia,	69
pellucida,	71
abyssicola,	74
Ilyarachna,	76
quadrispinosa,	76
Acanthocope,	78
spinicauda,	79
acutispina,	82
Arcturidæ,	85
Arcturus,	85
furcatus,	85
glacialis,	86
spinosus,	88
anna,	91
cornutus,	93
spinifrons,	94
purpureus,	96
brunneus,	97
abyssicola,	98
myops,	100
studeri,	100
oculatus,	102
americanus,	104
stebbingi,	105
Astacilla,	107
marionensis,	107
Arcturides,	108

	PAGE
Arcturides cornutus,	108
Apseudidæ,	109
Apseudes,	109
antarctica,	109
Typhlapseudes,	111
nereus,	112
Leiopus,	114
leptodactylus,	115
Tanaidæ,	119
Tanais,	119
willemoesii,	119
hirsutus,	120
Typhlotanais,	121
kerguelenensis.	121
brachyurus,	123
Neotanais,	124
americanus,	124
Leptognathia,	127
australis,	127
Paratanais,	129
dimorphus,	130
Bathytanais,	132
bathybrotes,	133
Anceidæ,	135
Anceus,	135
bathybius,	135
Anceus gigas,	137
tuberculosus,	139
latidens,	141
Anthuridæ,	143
Paranthura,	143
chiltoni,	143
neglecta,	144
Sphæromidæ,	145
Ceratocephalus,	147
grayanus,	148
Cymodocea,	150
darwini,	150
abyssorum,	150
Cymothoidæ,	152
Anuropus,	152
branchiatus,	154
THE ISOPODAN FAUNA OF DEEP WATER,	157
GEOGRAPHICAL DISTRIBUTION OF DEEP-SEA ISOPODA,	163
SPECIAL PECULIARITIES OF DEEP-SEA ISOPODA,	165
APPENDIX,	169
Typhlotanais brachyurus,	169
Ischnosoma thomsoni,	169
Macrostylis,	173
latifrons,	173
ADDITIONAL NOTE,	175

PLATE I.

PLATE I.

Figs. 1–10. TRICHOPLEON RAMOSUM.

Fig. 1. Female, dorsal view.

Fig. 2. Peduncle and a portion of flagellum of antennule.

Fig. 3. Basal joints of antenna.

Fig. 4. A portion of the surface of the body, highly magnified, to show the sculpturing.

Fig. 5. Maxillipede.

Fig. 6. Uropod.

Fig. 7. Ovary with oviduct, and orifice of latter.

Fig. 8. Thoracic appendage of first pair.

Fig. 9. Thoracic appendage of sixth pair.

Fig. 10. Portion of fifth joint of same appendage; more highly magnified.

Figs. 11–15. JÆROPSIS MARIONIS.

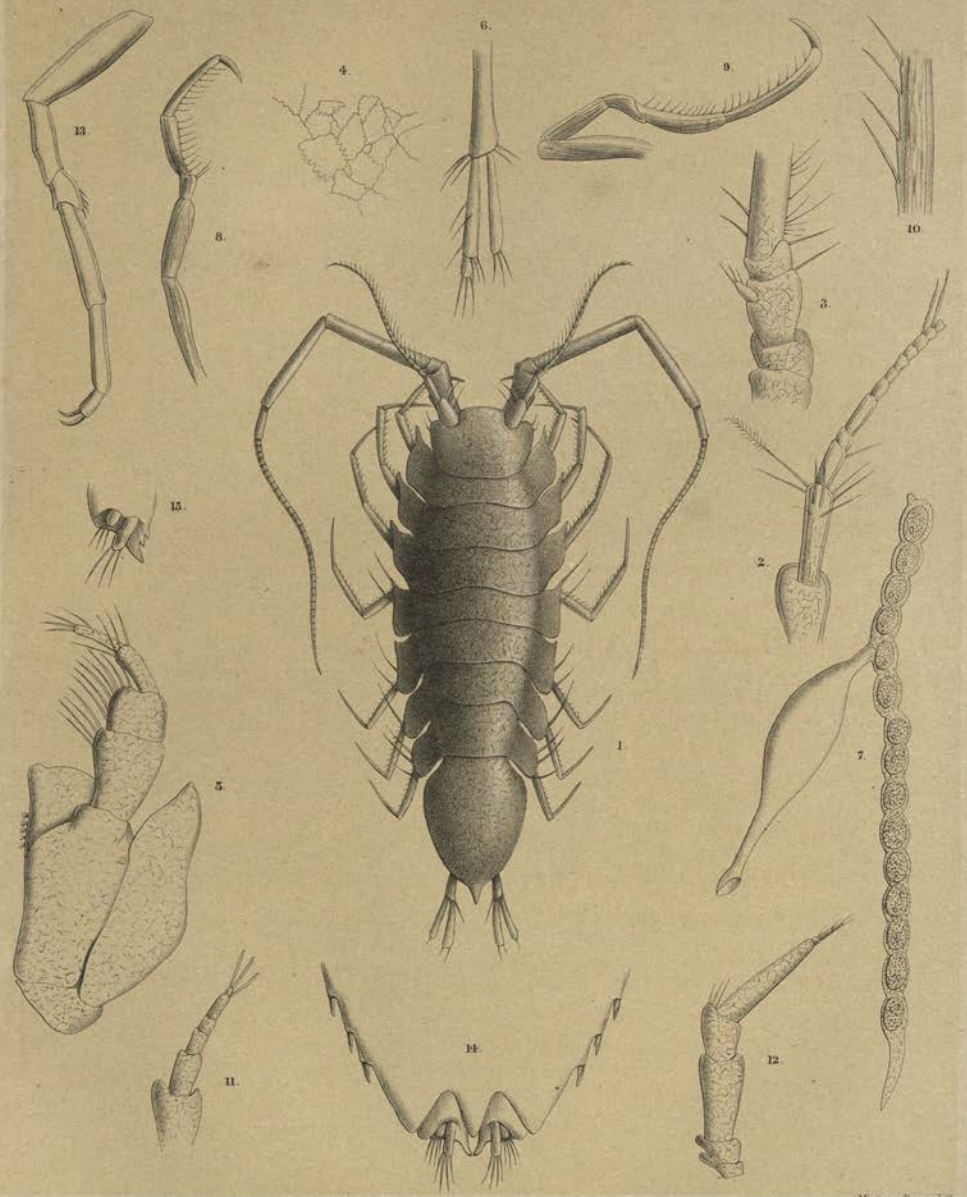
Fig. 11. Antennule.

Fig. 12. Antenna.

Fig. 13. One of the thoracic appendages.

Fig. 14. Posterior extremity of body.

Fig. 15. Uropod.



Mintern Bros. lith.

I—10 TRICHOPLEON RAMOSUM, Beddard. II—15. JÆROPSIS MARIONIS, Beddard.

PLATE II.

PLATE II.

Fig. 1. JÆROPSIS MARIONIS.

Fig. 1. Dorsal view of the animal.

Figs. 2–5. JANIRA TRISTANI.

Fig. 2. Female, dorsal view.

Fig. 3. One of the sixth pair of thoracic appendages.

Fig. 4. Basal joints and part of flagellum of anteinule.

Fig. 5. Basal joints of antenna.

Figs. 6–10. JÆRA PUBESCENS.

Fig. 6. Dorsal view of the animal.

Fig. 7. Eye, consisting only of two elements.

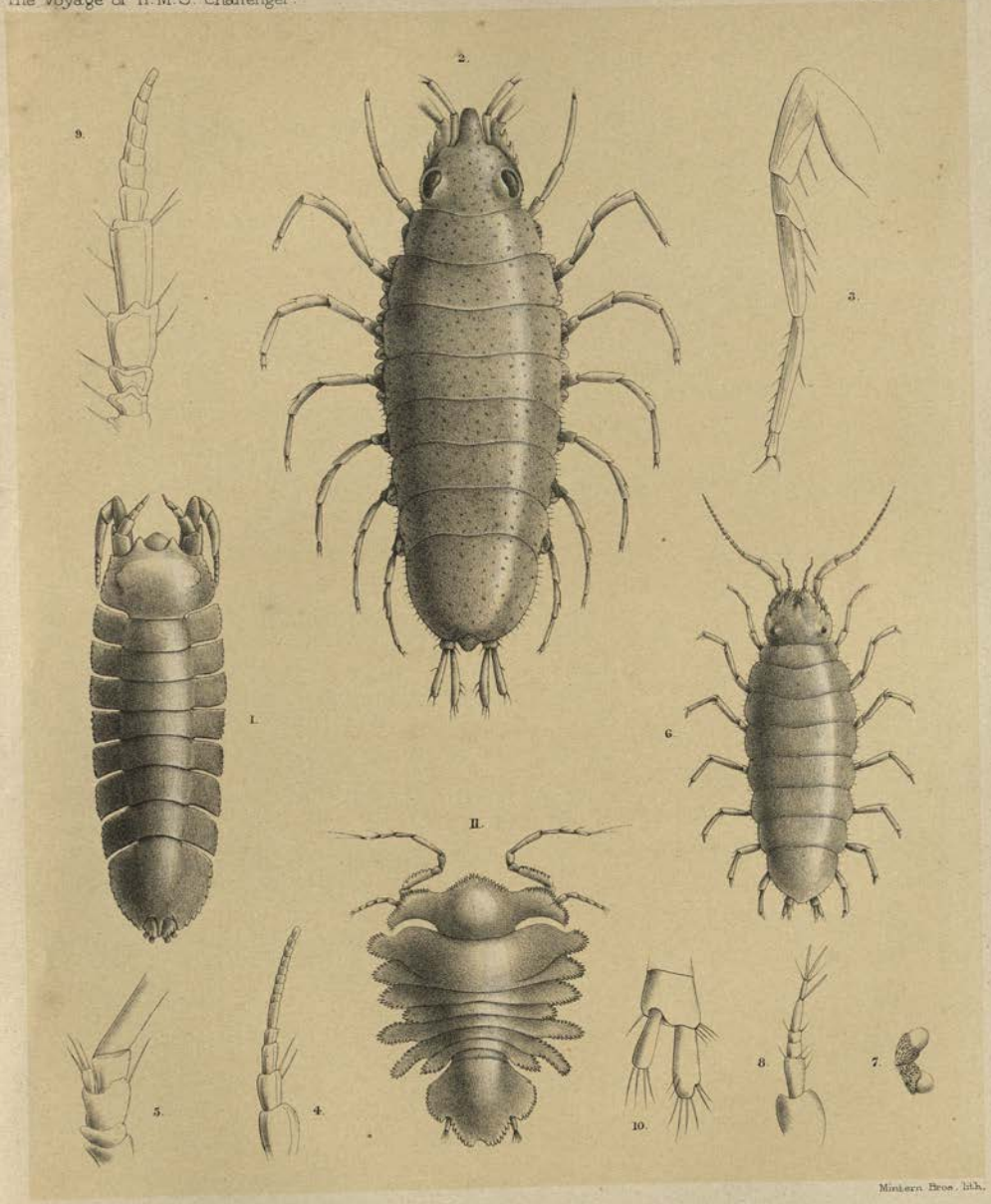
Fig. 8. Antennule.

Fig. 9. Antenna, peduncle and part of flagellum

Fig. 10. Uropod.

Fig. 11. NEASELLUS KERGUELENENSIS.

Fig. 11. Dorsal view of the animal.



Minlern Bros. lith.

I. JÆROPSIS MARIONIS, Beddard. 2–5. JANIRA TRISTANI, Beddard.
6–10. JÆRA PUBESCENS, Dana. II. NEASELLUS KERGUELENENSIS, Beddard.

PLATE III.

PLATE III.

Figs. 1–6. NEASELLUS KERGUELENENSIS.

Fig. 1. Antennule.

Fig. 2. Antenna.

Fig. 3. One of the first pair of thoracic limbs.

Fig. 4. One of the second pair of thoracic limbs.

Figs. 5, 6. Uropod, dorsal and ventral view.

Figs. 7–13. PLEUROGONIUM ALBIDUM.

Fig. 7. Female, dorsal view.

Fig. 8. Antennule.

Fig. 9. Antenna.

Fig. 10. One of the first pair of thoracic limbs.

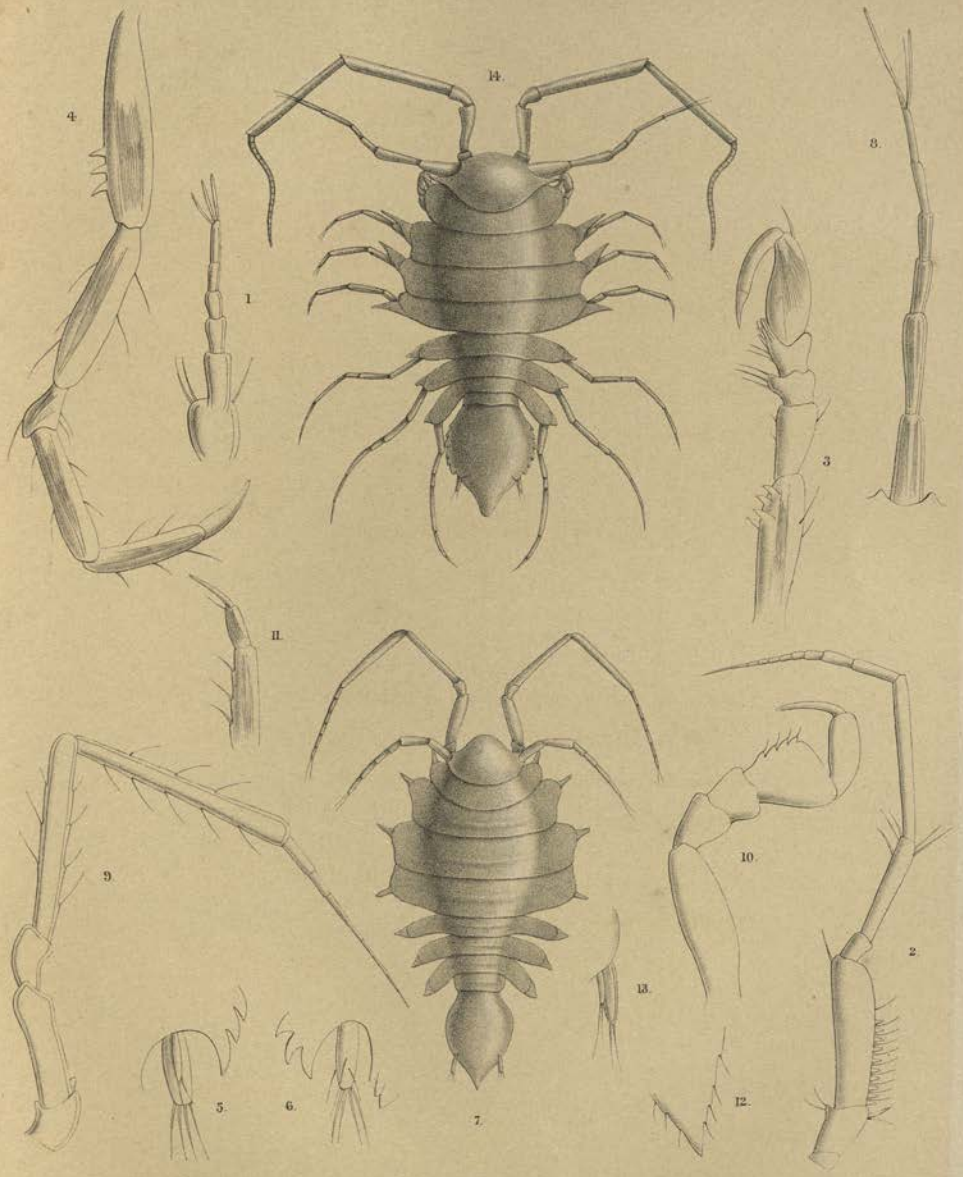
Fig. 11. Distal joints of one of the succeeding thoracic limbs.

Fig. 12. Terminal extremity of abdominal shield.

Fig. 13. Uropod.

Fig. 14. PLEUROGONIUM SERRATUM.

Fig. 14. Dorsal view of the animal.



Minterm. Bros. lith.

1—6. NEASELLUS KERGUELENENSIS, Beddard. 7—13. PLEUROGONIUM ALBIDUM, Beddard.
14. PLEUROGONIUM SERRATUM, Beddard.

PLATE IV.

PLATE IV.

Figs. 1–8. STENETRIUM HASWELLI.

Fig. 1. Male, dorsal view.

Fig. 2. Antennule.

Fig. 3. Basal joints of antenna.

Fig. 4. One of the first pair of thoracic appendages.

Fig. 5. Rudimentary exopodite of antenna.

Fig. 6. First pair of abdominal limbs.

Fig. 7. One of the second pair of abdominal limbs.

Fig. 8. Uropod.

Figs. 9–14. IOLANTHE ACANTHONOTUS.

Fig. 9. Female, dorsal view.

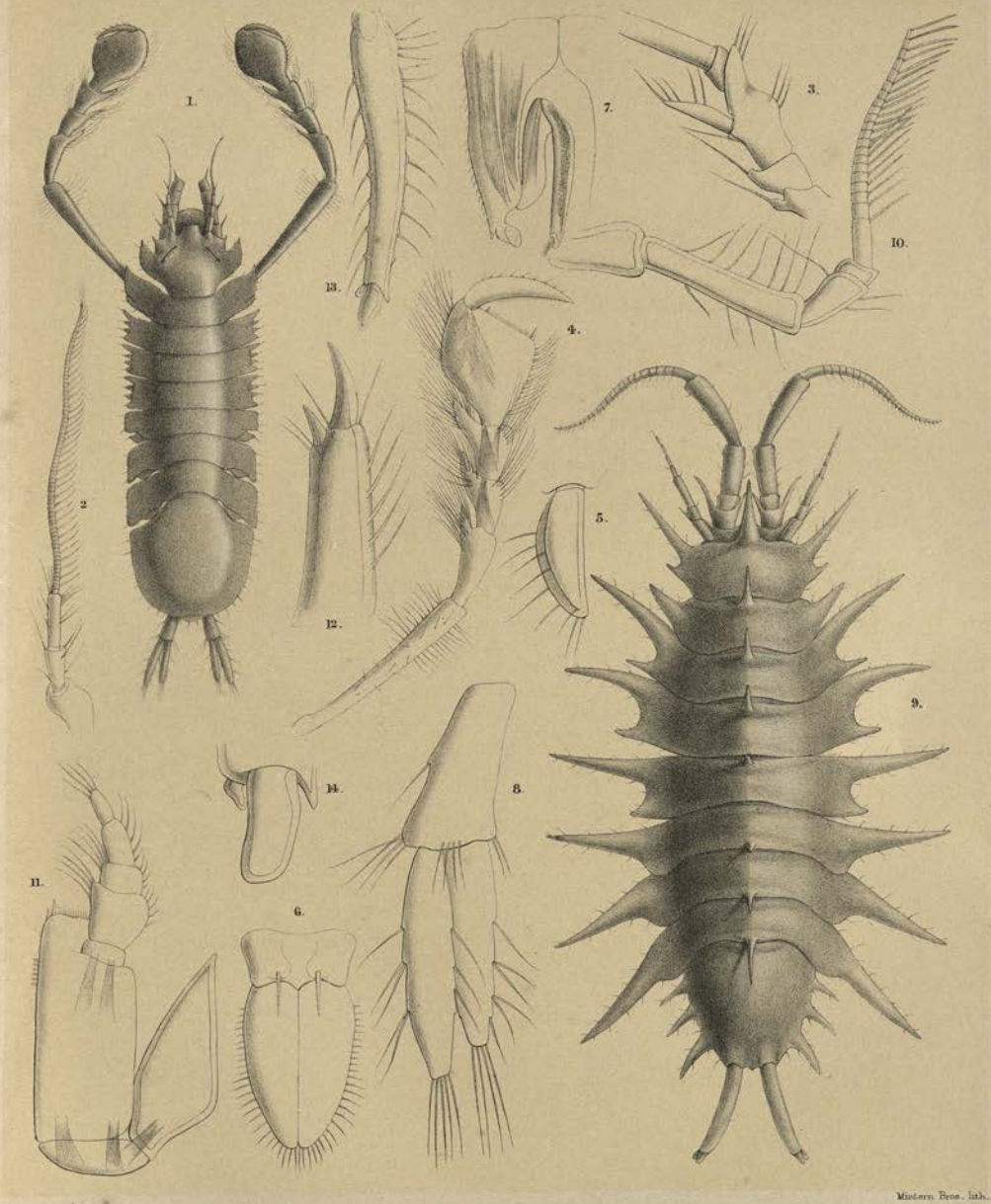
Fig. 10. Antennule.

Fig. 11. Maxillipede.

Fig. 12. Distal extremity of one of the thoracic limbs.

Fig. 13. Uropod.

Fig. 14. Exopodite and endopodite of uropod; more highly magnified.



Mintern Bros. lith.

1-8. STENETRIUM HASWELLI, Beddard.

9-14. IOLANTHE ACANTHONOTUS, Beddard.

PLATE V.

PLATE V.

Figs. 1–4. IOLANTHE ACANTHONOTUS.

Fig. 1. Maxilla of first pair.

Fig. 2. Antenna.

Fig. 3. Extremity of antennule, to show sensory hairs.

Fig. 4. Maxilla of second pair.

Figs. 5–8. IANTHOPSIS BOVALLII.

Fig. 5. Extremity of one of the thoracic limbs.

Fig. 6. First pair of abdominal limbs, from above.

Fig. 7. First pair of abdominal limbs, from below.

Fig. 8. Uropod.

Figs. 9–19. ASTRURUS CRUCICAUDA.

Fig. 9. Male, from above.

Fig. 10. Antennule.

Fig. 11. Basal joints of antenna.

Fig. 12. Maxillipede.

Fig. 13. Processes on inner side of maxillipede; more highly magnified.

Fig. 14. One of the first pair of thoracic appendages.

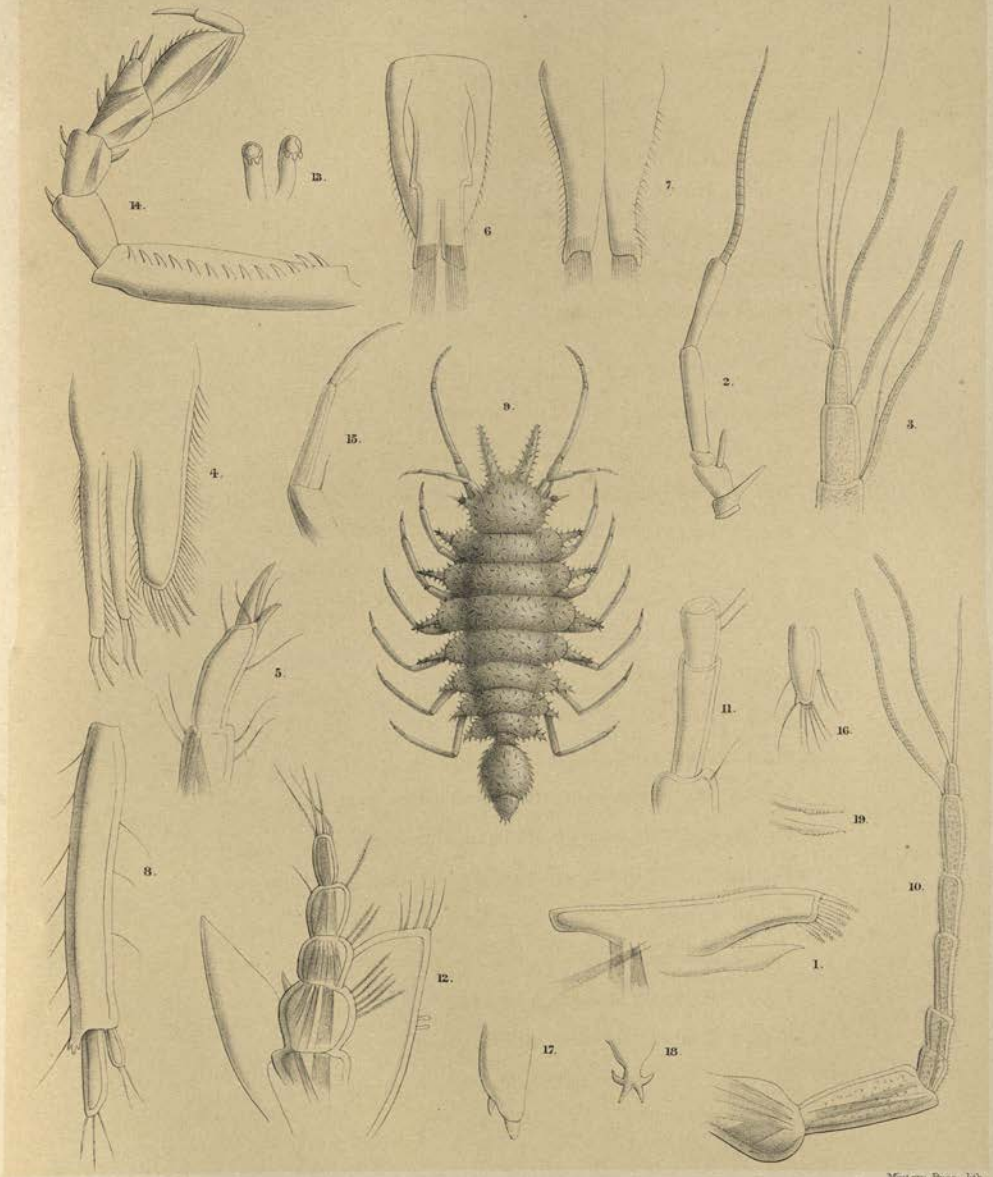
Fig. 15. Distal extremity of one of the succeeding thoracic limbs.

Fig. 16. Uropod.

Fig. 17. Extremity of uropod; more highly magnified and divested of hairs.

Fig. 18. Extremity of abdominal shield.

Fig. 19. Toothed spines from maxilla.



Mintern Bros. lith.

1–4. IOLANTHE ACANTHONOTUS, Beddard. 5–8. IANTHOPSIS BOVALLII, (Studer).
9–19. ASTRURUS CRUCICAUDA, Beddard.

PLATE VI.

PLATE VI.

Figs. 1–5. ISCHNOSOMA SPINOSUM.

Fig. 1. Male, from abov

Fig. 2. Antennule.

Fig. 3. Antenna.

Fig. 4. One of the thoracic appendages.

Fig. 5. Uropod.

Figs. 6–7. ISCHNOSOMA BACILLUS.

Fig. 6. Fragment of female example. The alimentary canal is indicated by its dark granular contents.

Fig. 7. One of the posterior thoracic appendages.

Figs. 8–13. ISCHNOSOMA BACILLOIDES.

Fig. 8. Fragment of male specimen.

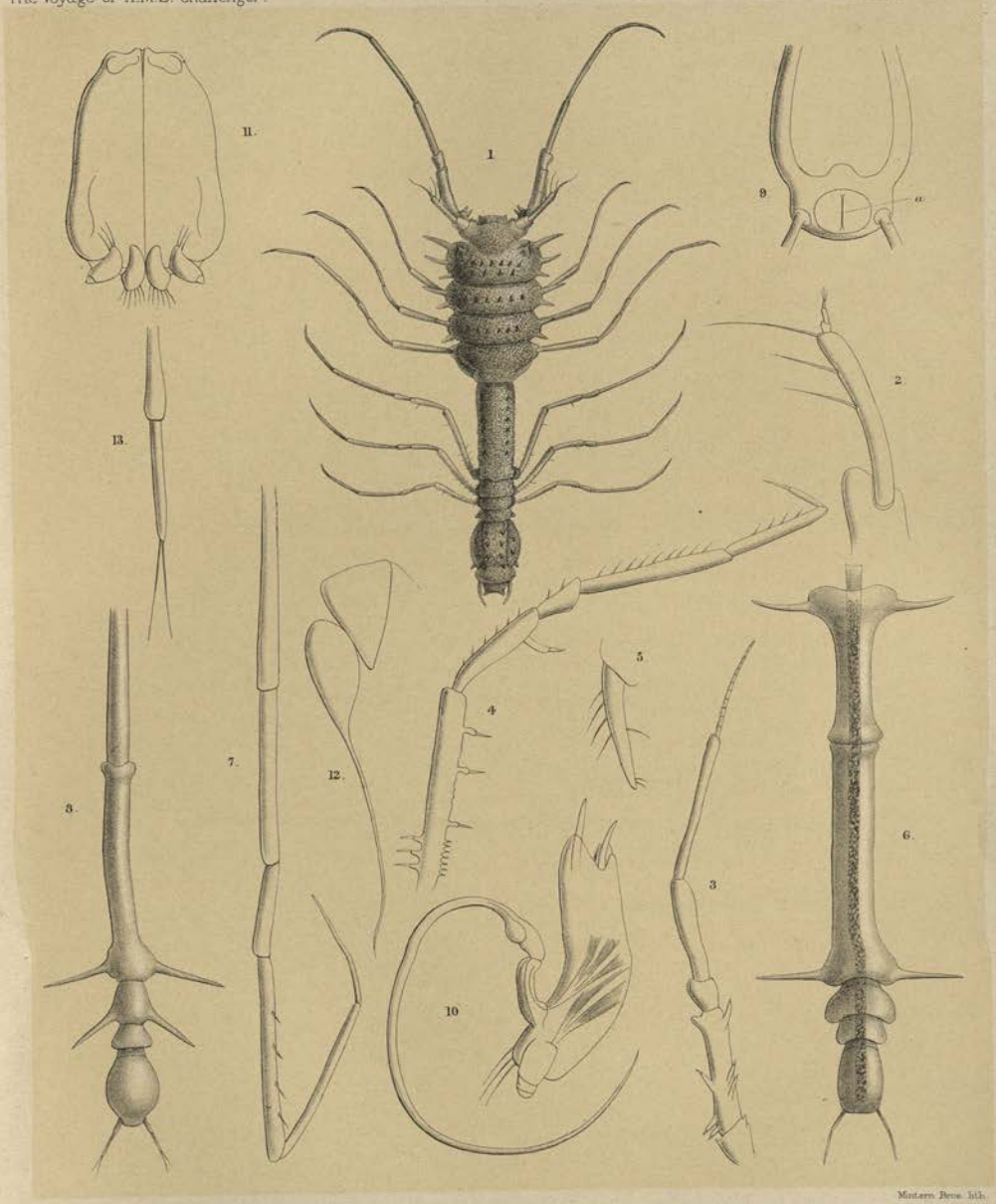
Fig. 9. Abdomen from beneath; *a*, anal flaps.

Fig. 10. One of the second pair of abdominal limbs, with long penial filament.

Fig. 11. First pair of abdominal appendages.

Fig. 12. Part of one of the third pair of abdominal limbs.

Fig. 13. Uropod.



Mintern Bros. lith.

1–5. ISCHNOSOMA SPINOSUM, Beddard.

6–7. ISCHNOSOMA BACILLUS, Beddard.

8–13. ISCHNOSOMA BACILLOIDES, Beddard.

PLATE VII.

PLATE VII.

Figs. 1–5. ANUROPUS BRANCHIATUS.

Fig. 1. Dorsal view.

Fig. 2. Lateral view.

Fig. 3. Front view of head and anterior thoracic segments, to display antennary appendages.

Fig. 4. Ventral view of head and anterior thoracic segments.

Fig. 5. One of the abdominal limbs.

Figs. 6–12. CYMODOCEA ABYSSORUM.

Fig. 6. Male, from above.

Fig. 7. Female, from above.

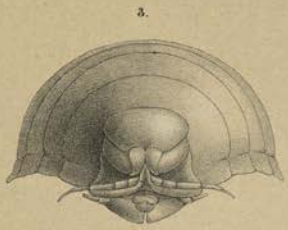
Fig. 8. Male, lateral view.

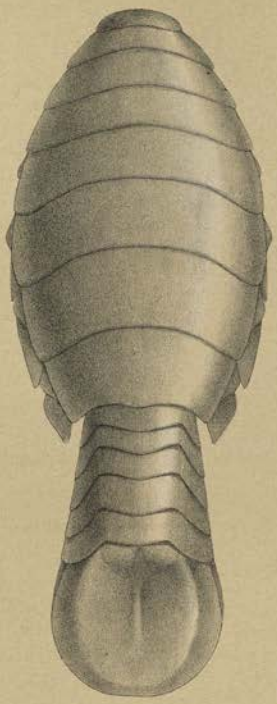
Fig. 9. One of the maxillipedes.

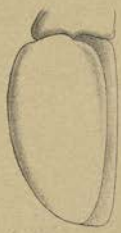
Fig. 10. One of the abdominal appendages of the second pair.

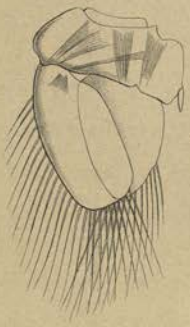
Fig. 11. Uropod of female.

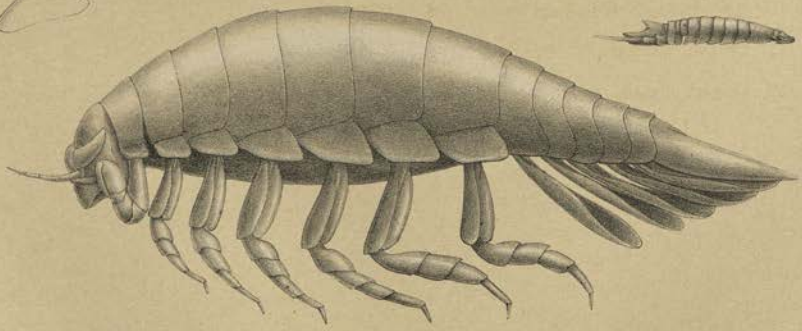
Fig. 12. Uropod of male.











Mintern Bros. lith.

1–5. ANUROPUS BRANCHIATUS, Beddard. 6–12. CYMODOCEA ABYSSORUM, Beddard.

PLATE VIII.

PLATE VIII.

Figs. 1–5. ACANTHOCOPE ACUTISPINA.

Fig. 1. Dorsal view.

Fig. 2. Abdominal shield.

Fig. 3. Uropod.

Fig. 4. One of the spiniform epimera.

Fig. 5. Antennule.

Figs. 6–12. ACANTHOCOPE SPINICAUDA.

Fig. 6. Dorsal view.

Fig. 7. Portion of antennule.

Fig. 8. Basal joints of antenna.

Fig. 9. One of the posterior pairs of thoracic limbs.

Fig. 10. One of the following pair of thoracic limbs; more highly magnified.

Fig. 11. Termination of abdominal shield, with uropod.

Fig. 12. Abdominal shield.

Mintern Bros. lith.

1–5. ACANTHOCOPE ACUTISPINA, Beddard. 6–12. ACANTHOCOPE SPINICAUDA, Beddard.

PLATE IX.

PLATE IX.

Figs. 1–7. EURYCOPE NOVÆ-ZELANDIÆ.

Fig. 1. Female, dorsal surface.

Fig. 2. Young of this species or of *Eurycope fragilis*.

Fig. 3. Mandible.

Fig. 4. Extremity of mandible; more highly magnified.

Fig. 5. One of the posterior thoracic appendages.

Figs. 6, 7. Dorsal and ventral aspect of first pair of abdominal appendages of male.

Figs. 8–12. EURYCOPE FRAGILIS.

Fig. 8. Female, dorsal view.

Fig. 9. Antennule.

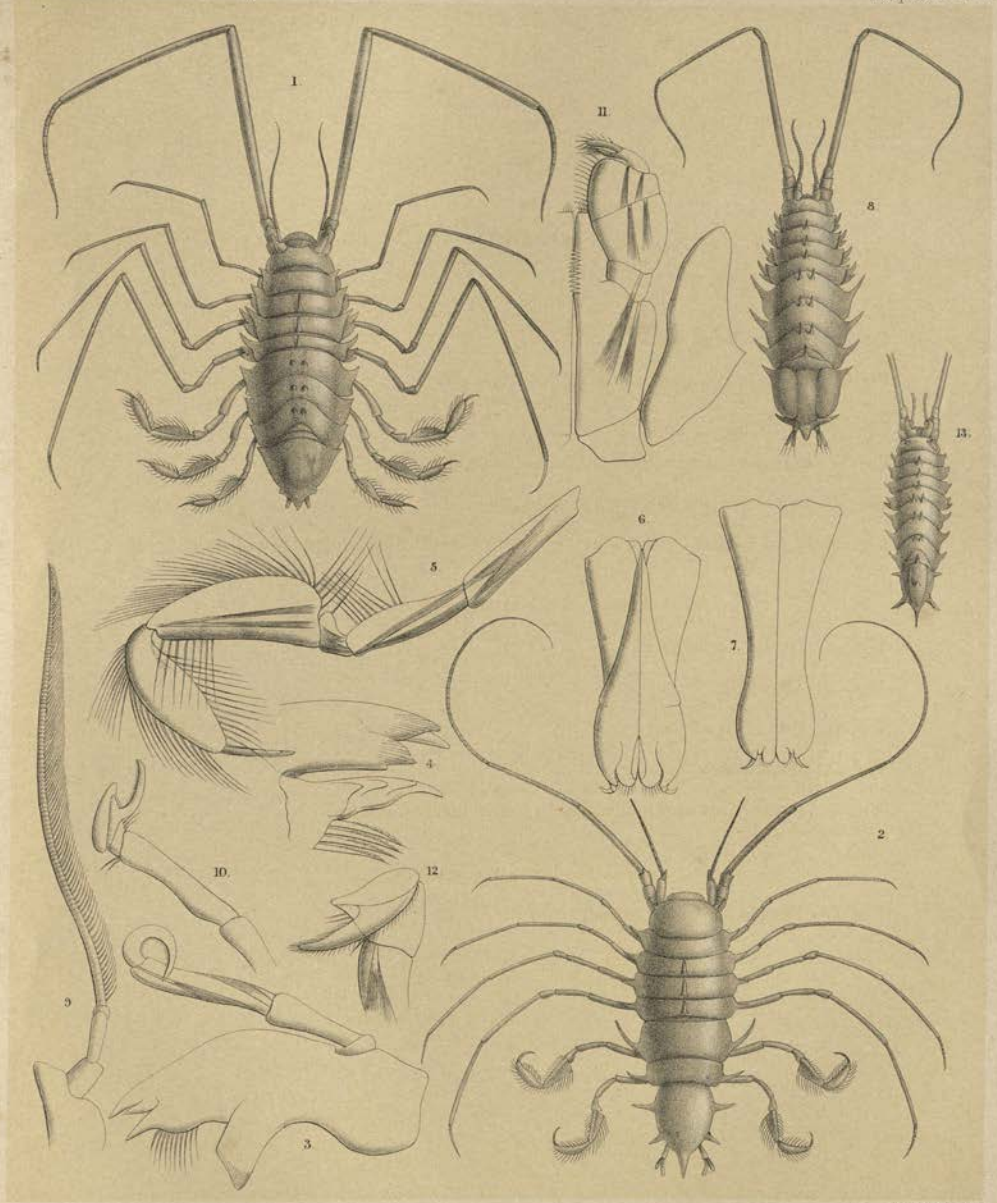
Fig. 10. Palp of mandible.

Fig. 11. Maxillipede.

Fig. 12. Distal joints of mandibular palp; more highly magnified.

Fig. 13. EURYCOPE ATLANTICA.

Fig. 13. Dorsal view of the animal.



Mintern Bros. lith.

1–7. EURYCOPE NOVÆ ZELANDIÆ, Beddard. 8–12. EURYCOPE FRAGILIS, Beddard.
13. EURYCOPE ATLANTICA, Beddard.

PLATE X.

PLATE X.

Figs. 1–4. MUNNOPSIS LATIFRONS.

Fig. 1. Female, dorsal aspect.

Fig. 2. Antennæ.

Fig. 3. One of the first pair of thoracic appendages.

Fig. 4. Uropod.

Fig. 5. EURYCOPE INTERMEDIA.

Fig. 5. Dorsal aspect.

Figs. 6, 7. EURYCOPE SPINOSA.

Fig. 6. Dorsal aspect.

Fig. 7. Lateral aspect.

Figs. 8–12. ANCEUS TUBERCULOSUS.

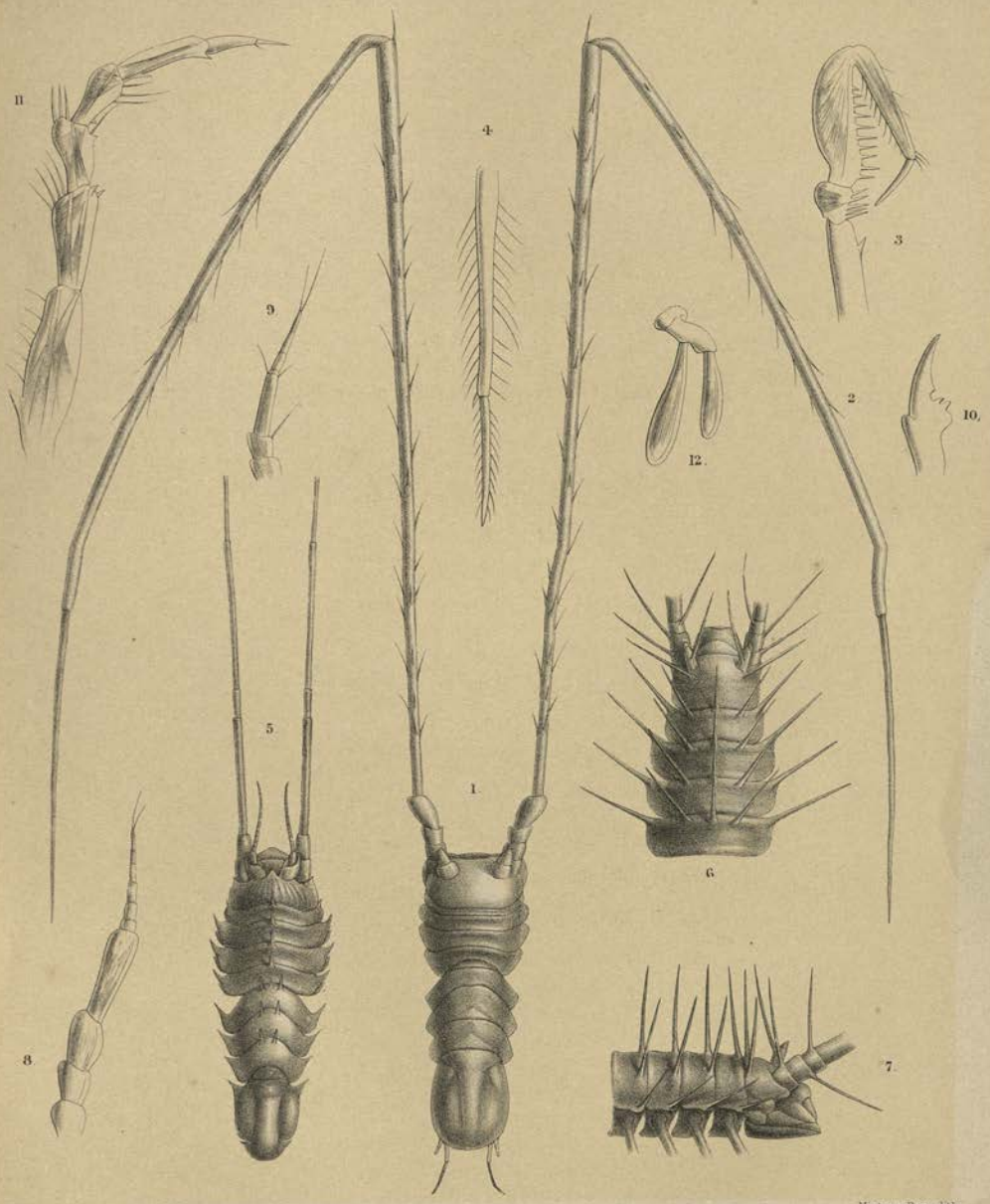
Fig. 8. Antenna.

Fig. 9. Antennule.

Fig. 10. Mandible.

Fig. 11. One of the thoracic limbs.

Fig. 12. One of the abdominal limbs.



Mintern Bros. lith.

1–4. MUNNOPSIS LATIFRONS, Beddard.
5. EURYCOPE INTERMEDIA, Beddard.
6–7. EURYCOPE SPINOSA, Beddard.
8–12. ANCEUS TUBERCULOSUS. Beddard.

PLATE XI.

PLATE XI.

Figs. 1–12. Eurycope sarsii.

Fig. 1. Female, dorsal aspect.

Fig. 2. Female, lateral aspect.

Fig. 3. Mandible.

Fig. 4. One of the first pair of maxillæ.

Fig. 5. One of the second pair of maxillæ.

Fig. 6. Maxillipede.

Fig. 7. Inner margin of maxillipede; more highly magnified.

Figs. 8–10. Sensory (?) organs along inner edge of maxillipede; very highly magnified.

Fig. 11. Lower lip.

Fig. 12. Upper lip.

(Figs. 3–12 are from drawings by the late Dr. v. Willemoes-Suhm.)

Fig. 13. Pleurogonium minutum.

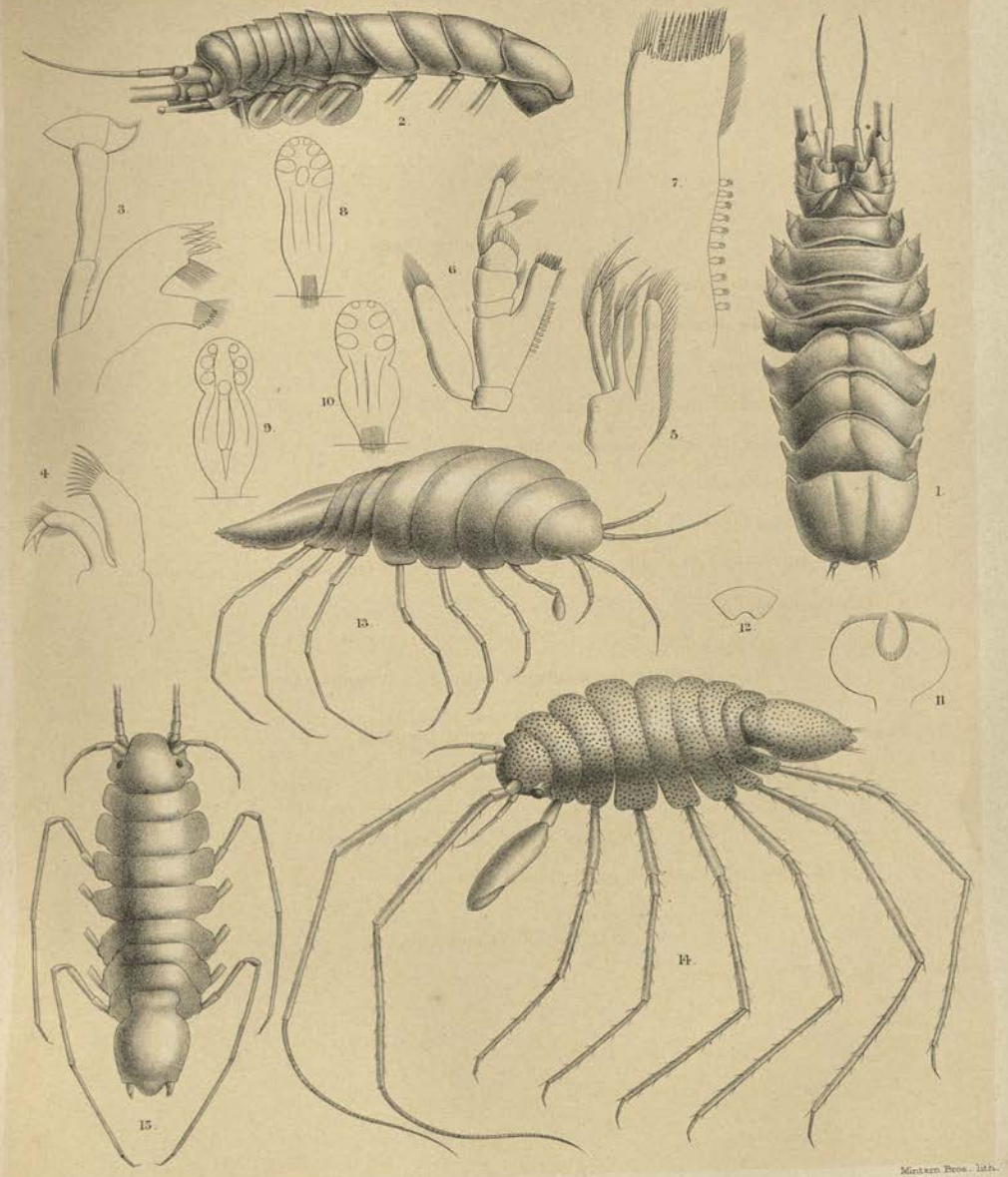
Fig. 13. View from above and partly from the left side.

Fig. 14. Munna maculata.

Fig. 14. View from above and partly from the left side.

Fig. 15. Munna pallida.

Fig. 15. Dorsal aspect.



Mintern Bros. lith.

1–12. EURYCOPE SARSII, Beddard. 13. PLEUROGONIUM MINUTUM, Beddard.
14. MUNNA MACULATA, Beddard. 15. MUNNA PALLIDA, Beddard.

PLATE XII.

PLATE XII.

Fig. 1. LEIOPUS LEPTODACTYLUS.

Fig. 1. Mandible.

Figs. 2–6. ILYARACHNA QUADRISPINOSA.

Fig. 2. Female, dorsal aspect.

Fig. 3. Antennule.

Fig. 4. Terminal region of abdomen.

Fig. 5. Uropod.

Fig. 6. One of the posterior thoracic appendages.

Figs. 7–14. ACANTHOMUNNA PROTEUS.

Fig. 7. Male, dorsal aspect.

Figs. 8, 8*b*. Branched spines covering the body.

Fig. 9. Antennule.

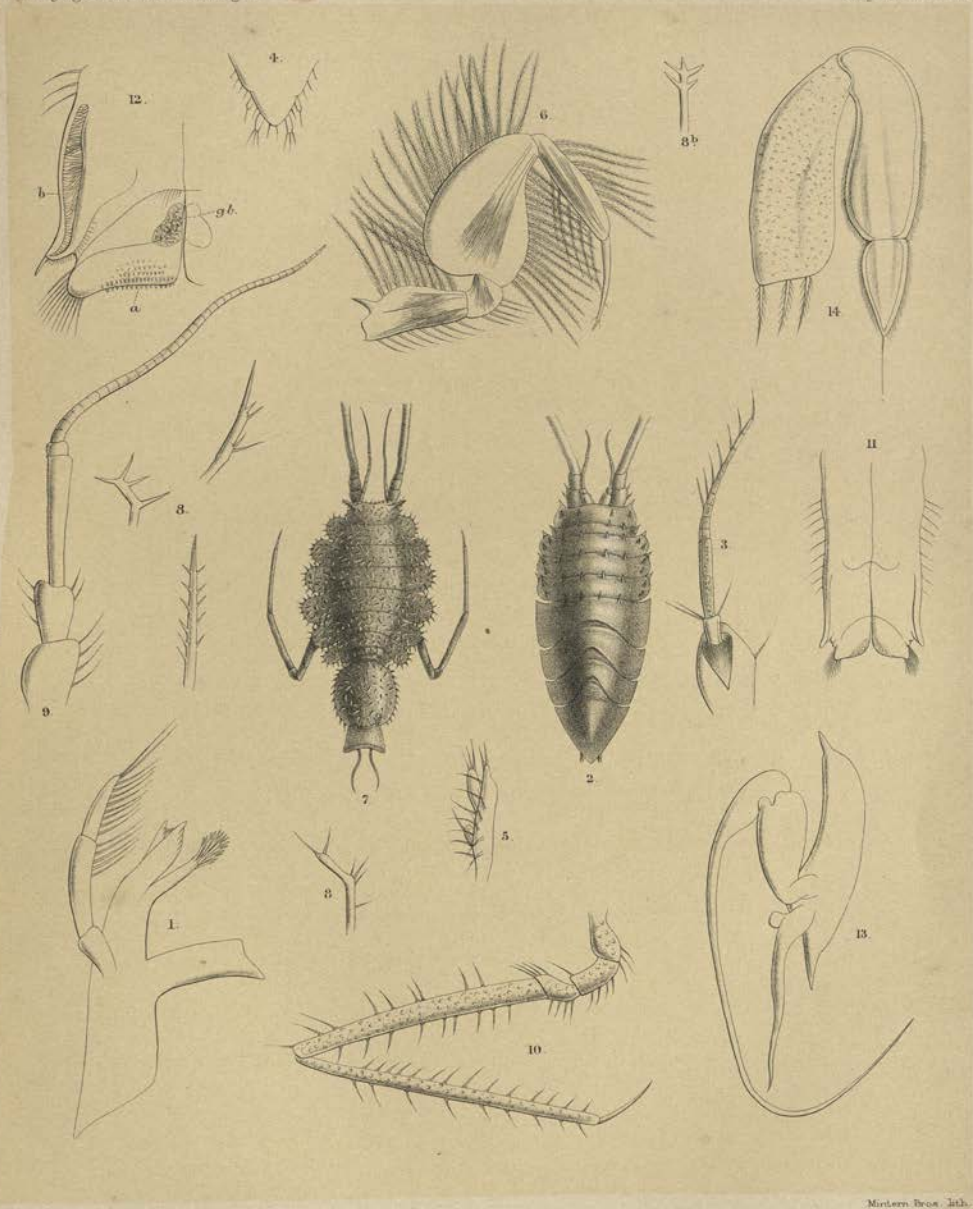
Fig. 10. One of the thoracic limbs.

Fig. 11. One of the first pair of abdominal appendages.

Fig. 12. Distal region of same appendages; more highly magnified. *a*, sensory (?) processes; *gl*, ganglionic mass; *b*, sensory hairs.

Fig. 13. One of the second pair of abdominal appendages, with penial filament.

Fig. 14. One of the third pair of abdominal appendages.



Mintern Bros. lith.

1. LEIOPUS LEPTODACTYLUS, Beddard. 2—6. ILYARACHNA QUADRISPINOSA, Beddard.
7—14. ACANTHOMUNNA PROTEUS, Beddard.

PLATE XIII.

PLATE XIII.

MUNNOPSIS AUSTRALIS.

Fig. 1. Female, dorsal aspect.

Fig. 2. Antennule.

Fig. 3. Antenna, the distal extremity broken.

Fig. 4. Distal joints of first thoracic limb.

Fig. 5. Second thoracic limb.

Fig. 6. Terminal joints of same appendage; more highly magnified.

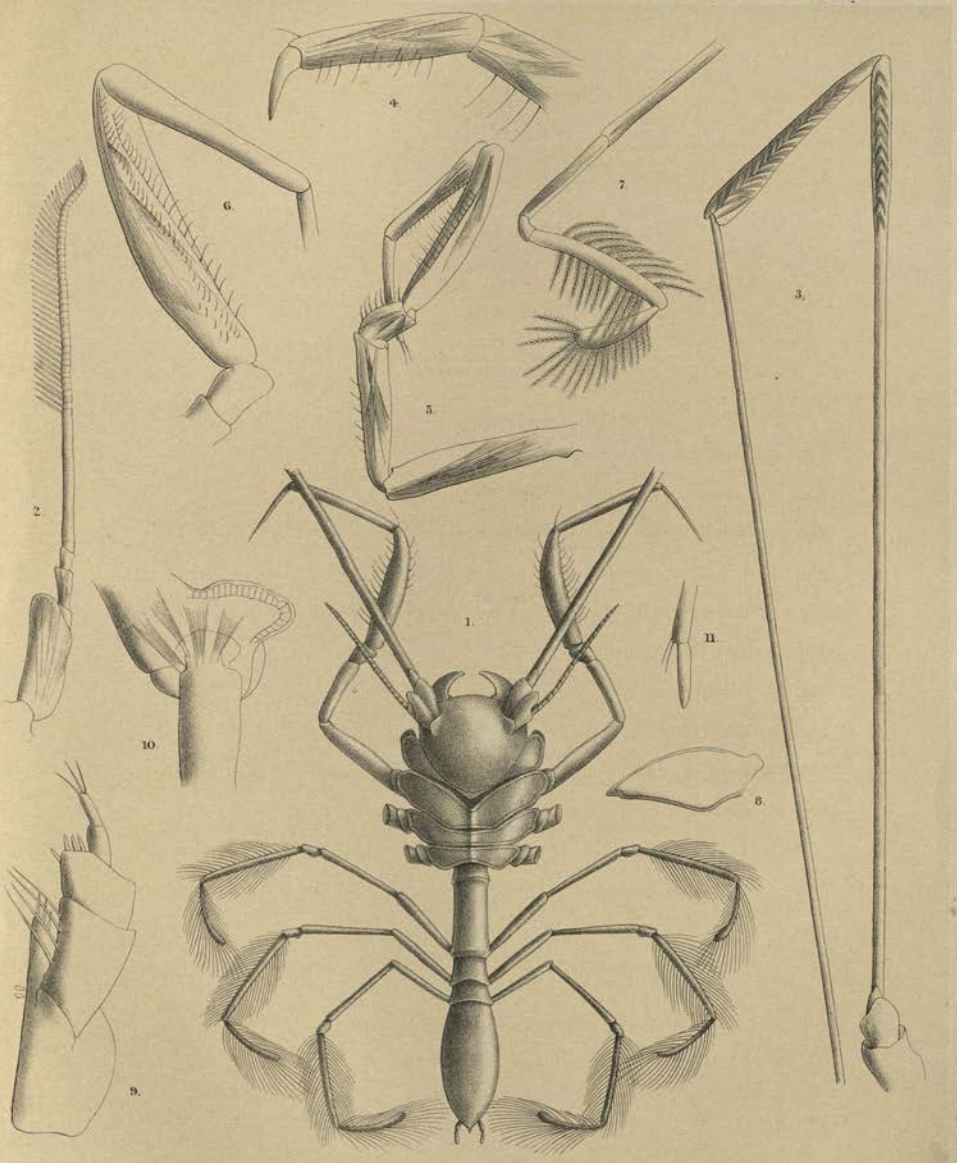
Fig. 7. Fifth thoracic limb.

Fig. 8. Mandible.

Fig. 9. Maxillipede.

Fig. 10. Point of attachment of one of the thoracic limbs with ovigerous lamella (?).

Fig. 11. Uropod.



Muntern Bros. lith.

MUNNOPSIS AUSTRALIS, Beddard.

PLATE XIV.

PLATE XIV.

Figs. 1–4. EURYCOPE PELLUCIDA.

Fig. 1. Male, lateral view.

Fig. 2. Palp of maxillipede.

Fig. 3. Peduncle and part of flagellum of antennule.

Fig. 4. Portion of flagellum; more highly magnified.

Figs. 5–8. EURYCOPE ABYSSICOLA.

Fig. 5. Female, lateral view.

Fig. 6. Distal joints of fifth thoracic limb.

Fig. 7. One of the first pair of thoracic appendages.

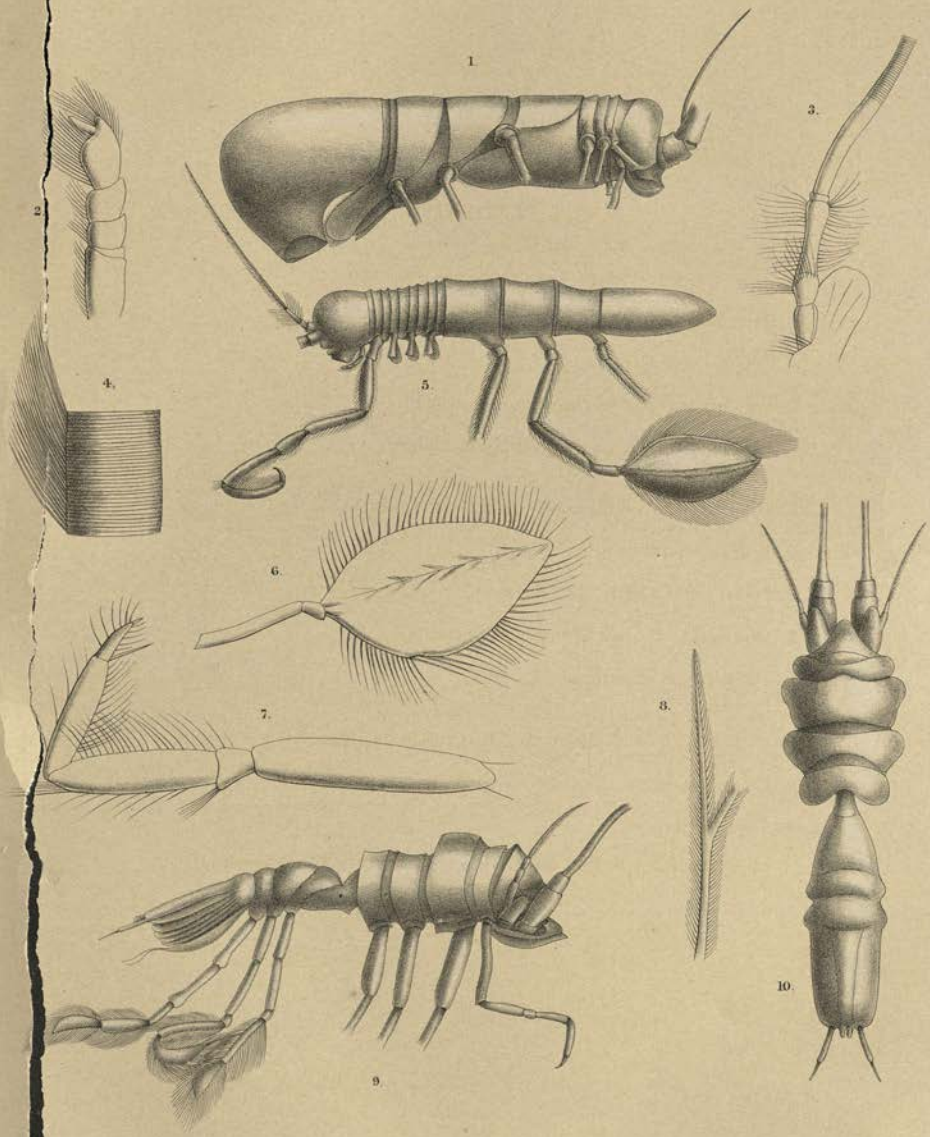
Fig. 8. Distal region of antenna.

Figs. 9, 10. MUNNOPSIS GRACILIS.

Fig. 9. Lateral aspect.

Fig. 10. Dorsal aspect.

(Figs. 1, 2, 5, 8, 9, 10, from drawings by the late Dr. v. Willemoes-Suhm.)



Mintern Bros. lith.

1–4. EURYCOPE PELLUCIDA, Beddard. 5–8. EURYCOPE ABYSSICOLA, Beddard.
9, 10. MUNNOPSIS GRACILIS, Beddard.

PLATE XV.

PLATE XV.

Figs. 1–3. APSEUDES ANTARCTICA.

Fig. 1. Dorsal aspect.

Fig. 2. Antenna.

Fig. 3. One of the third pair of thoracic appendages.

Fig. 3*a*. Forceps of the first pair of thoracic appendages

Fig. 4. TYPHLAPSEUDES NEREUS.

Fig. 4. Dorsal aspect.

Figs. 5–12. LEIOPUS LEPTODACTYLUS.

Fig. 5. Dorsal aspect.

Fig. 6. Antennule.

Fig. 7. One of the first pair of maxillæ.

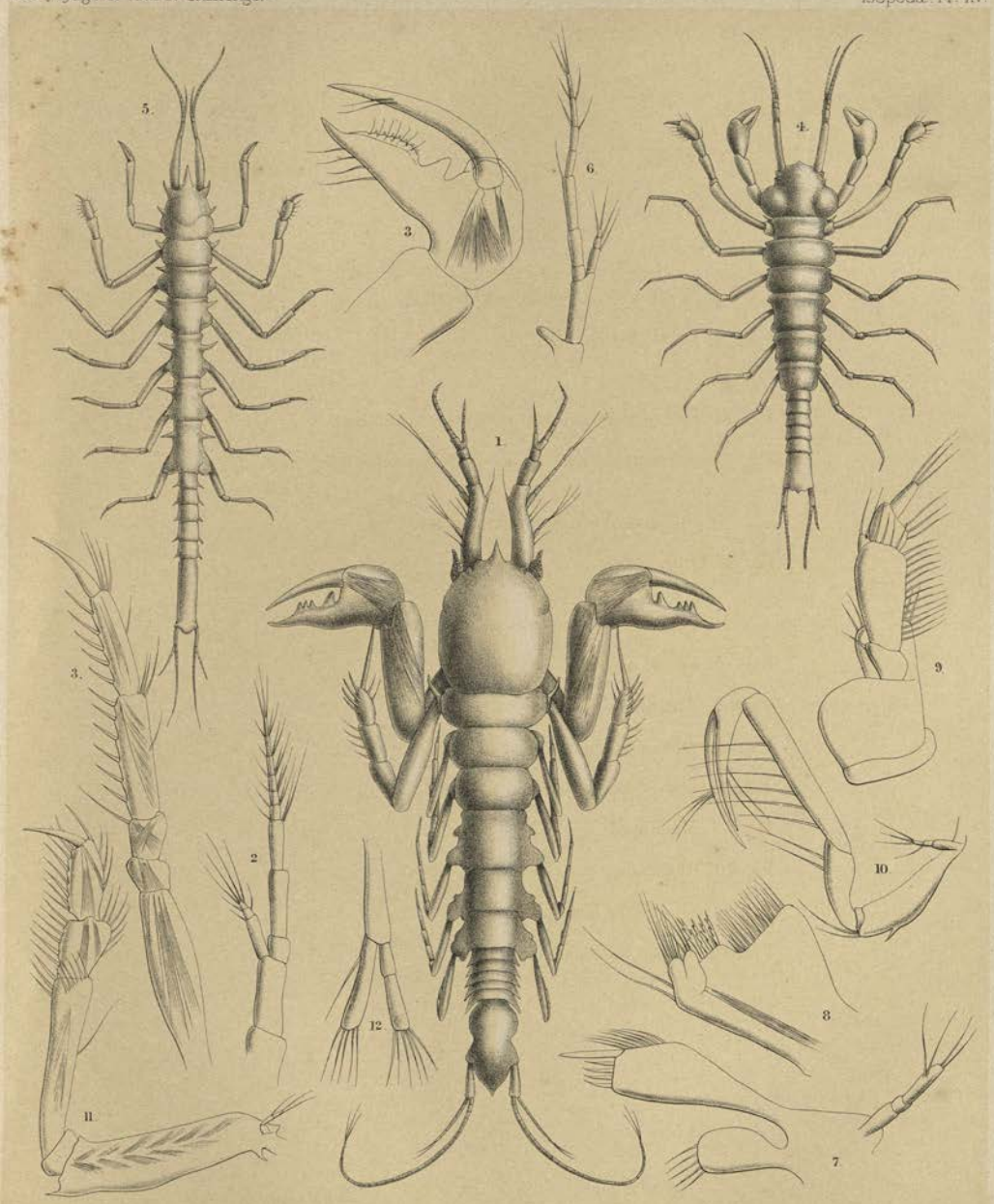
Fig. 8. One of the second pair of maxillæ.

Fig. 9. Maxillipede.

Fig. 10. Chelipede.

Fig. 11. One of the fossorial limbs.

Fig. 12. One of the abdominal limbs.



Mintern Bros. lith.

1–3. APSEUDES ANTARCTICA, Beddard. 4. TYPHLAPSEUDES NEREUS, Beddard.
5–12. LEIOPUS LEPTODACTYLUS, Beddard.

PLATE XVI.

PLATE XVI.

Figs. 1–3. TYPHLOTANAIS KERGUELENENSIS.

Fig. 1. Lateral aspect.

Fig. 2. Antennules and cephalic segments, from above.

Fig. 3. Chelipede.

Figs. 4–6. NEOTANAIS AMERICANUS.

Fig. 4. Male, dorsal aspect.

Fig. 5. Antennule.

Fig. 6. Antenna.

Fig. 7. TYPHLOTANAIS BRACHYURUS.

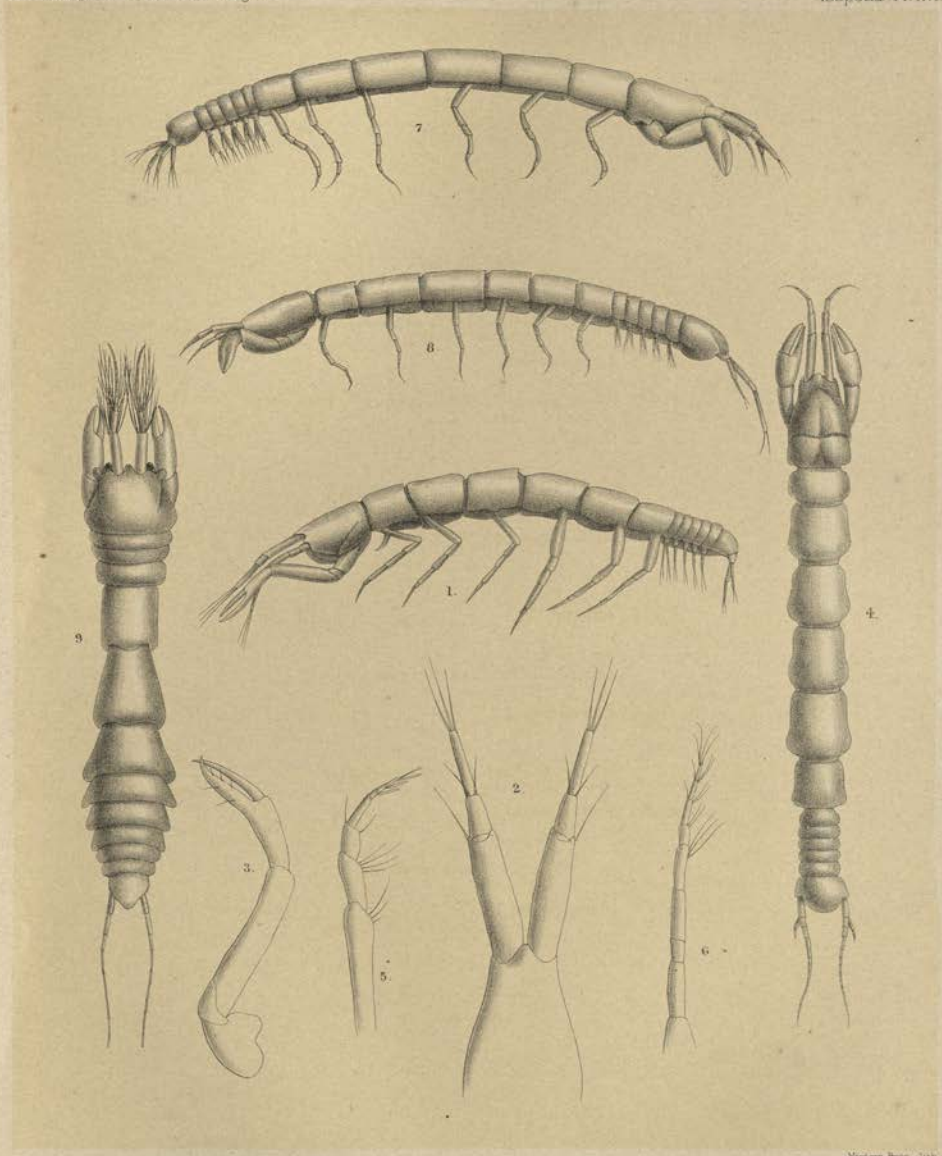
Fig. 7. Lateral aspect.

Fig. 8. LEPTOGNATHIA AUSTRALIS.

Fig. 8. Lateral aspect.

Fig. 9. TANAIS HIRSUTUS.

Fig. 9. Dorsal aspect.



1–3. TYPHLOTANAIS KERGUELENENSIS, Beddard. 4–6. NEOTANAIS AMERICANUS, Beddard. 7. TYPHLOTANAIS BRACHYURUS, Beddard.
8. LEPTOGNATHIA AUSTRALIS, Beddard. 9. TANAIS HIRSUTUS, Beddard.

PLATE XVI

PLATE XVII.

Fig. 1–8. PARATANAIS DIMORPHUS.

Fig. 1. Male, dorsal aspect.

Fig. 2. Female, lateral aspect.

Fig. 3. Chelipede of male.

Fig. 4. Chelipede in position of rest.

Fig. 5. Cephalic segment of male, showing antennules and antenna

Fig. 6. Maxillipedes.

Fig. 7. Uropod.

Fig. 8. One of the abdominal appendage

Figs. 9–14. BATHYTANAIS BATHYBROTES.

Fig. 9. Male, seen from above and also from the side.

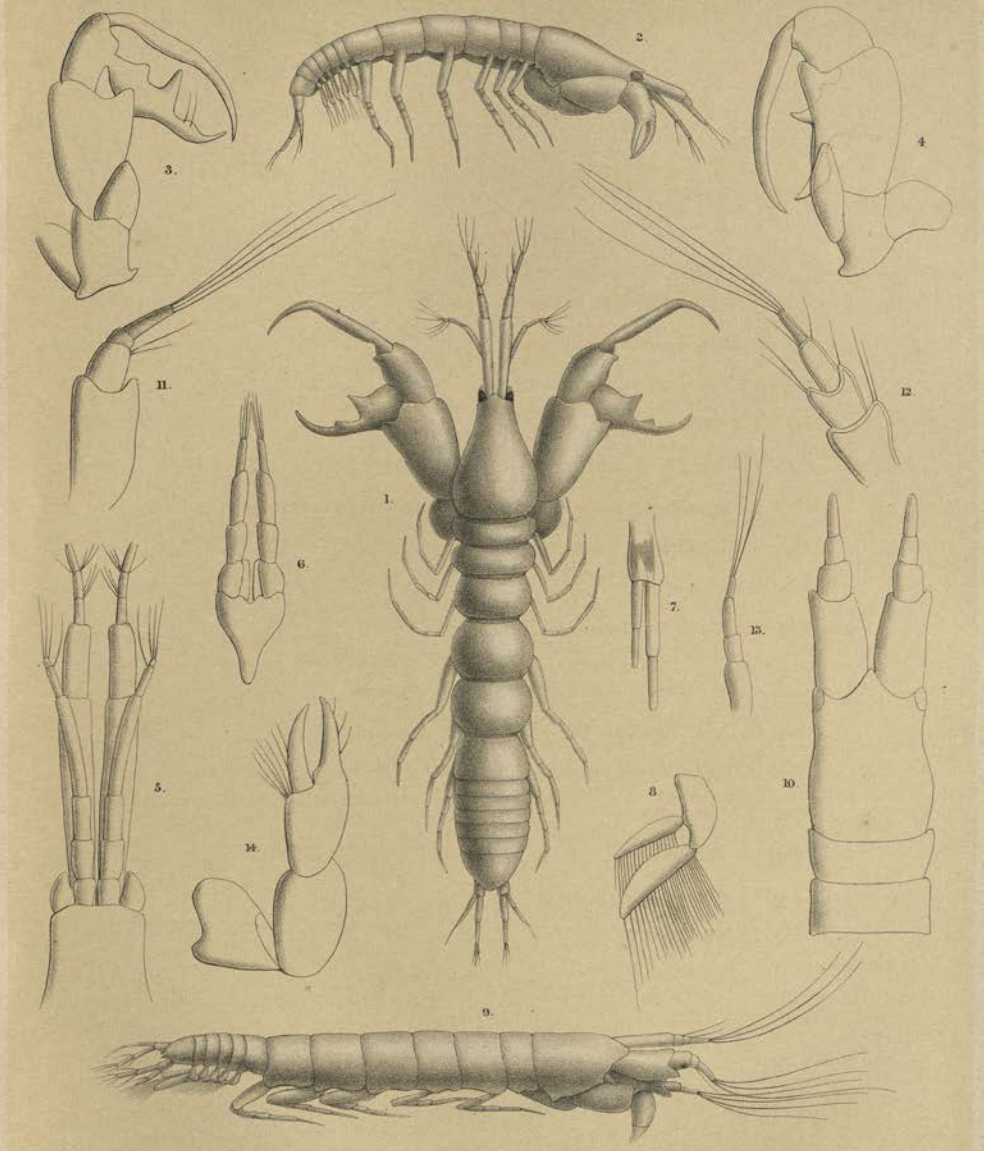
Fig. 10. Cephalic segments with antennules.

Fig. 11. Antennules.

Fig. 12. Antenna.

Fig. 13. Antenna, dorsal aspect.

Fig. 14. Chelipede.



Mintern Bros. lith.

1–8. PARATANAIS DIMORPHUS, Beddard. 9–14. BATHYTANAIS BATHYBROTES, Beddard.

PLATE XVIII.

PLATE XVIII.

Figs. 1–7. ANCEUS BATHYBIUS.

Fig. 1. Unique fragment, dorsal aspect.

Fig. 2. Cephalic region, from below.

Fig. 3. Maxillipede.

Fig. 4. Sensory processes of maxillipede; more highly magnified.

Fig. 5. First thoracic appendage.

Fig. 6. One of the anterior pairs of thoracic limbs.

Fig. 7. One of the posterior pairs of thoracic limbs.

Figs. 8–10. ANCEUS GIGAS.

Fig. 8. Male, dorsal aspect.

Fig. 9. Female, dorsal aspect.

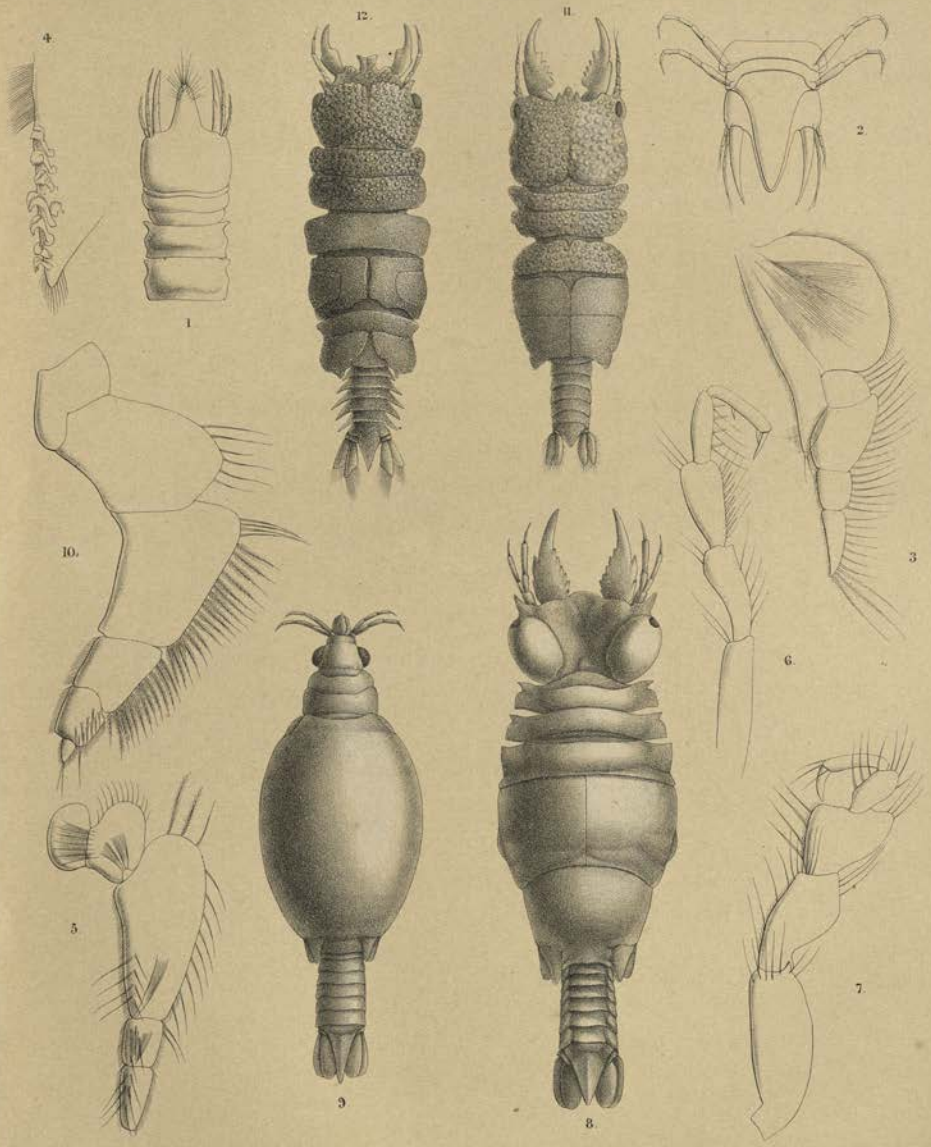
Fig. 10. First thoracic appendage of male.

Fig. 11. ANCEUS LATIDENS.

Fig. 11. Dorsal aspect.

Fig. 12. ANCEUS TUBERCULOSUS.

Fig. 12. Dorsal aspect.



Mintern Bros. lith.

1—7. ANCEUS BATHYBIUS, Beddard.
8—10. ANCEUS GIGAS, Beddard.
11. ANCEUS LATIDENS, Beddard.
12. ANCEUS TUBERCULOSUS, Beddard.

PLATE XIX.

PLATE XIX.

Figs. 1–5. ARCTURUS ANNA.

Fig. 1. Female, dorsal aspect.

Fig. 2. Female, lateral aspect.

Fig. 3. One of the anterior thoracic appendages.

Fig. 4. One of the posterior thoracic appendages.

Fig. 5. Basal joints of antenna.

Figs. 6–12. ARCTURUS CORNUTUS.

Fig. 6. Female, dorsal aspect.

Fig. 7. Female, lateral aspect.

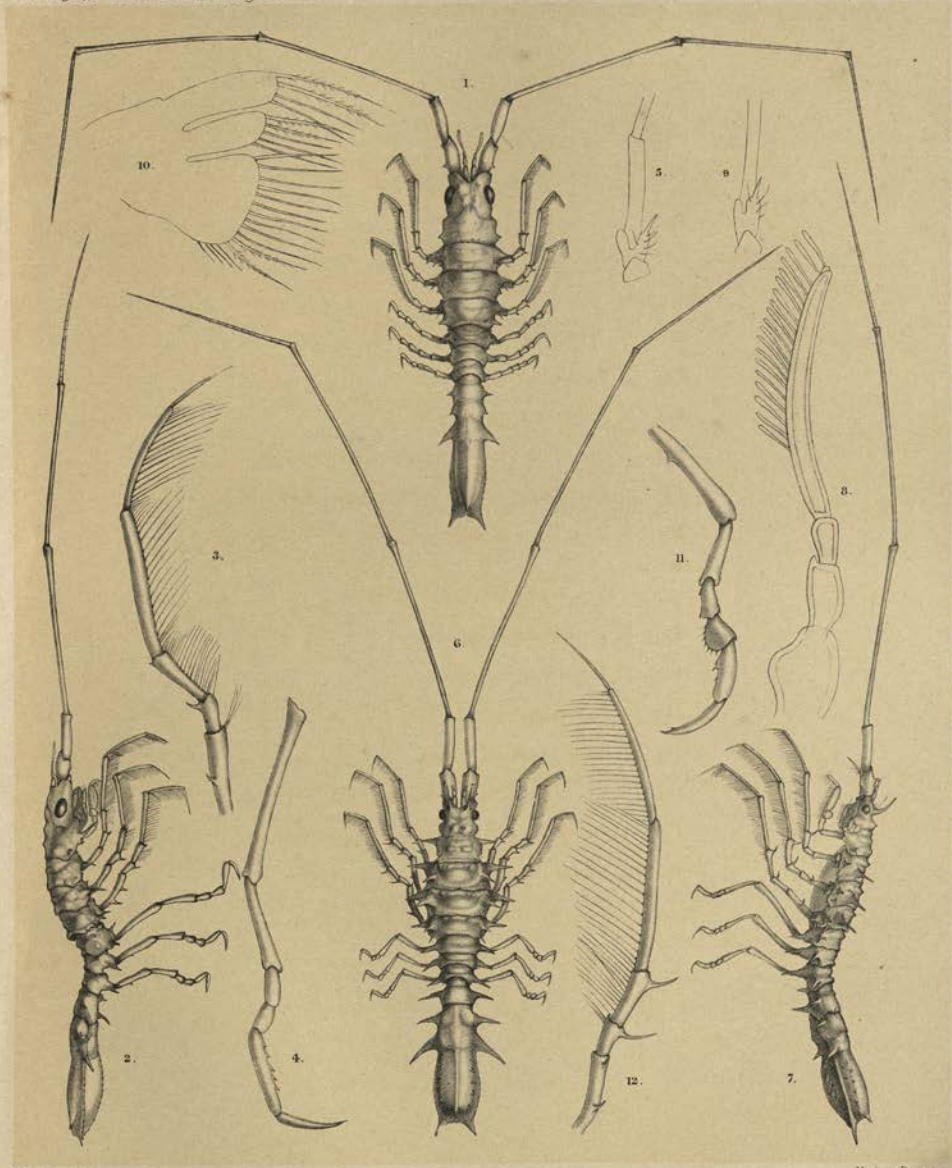
Fig. 8. Antennule.

Fig. 9. Basal joints of antenna.

Fig. 10. One of the second pair of maxillæ.

Fig. 11. One of the posterior thoracic appendages.

Fig. 12. One of the anterior thoracic appendages.



P. Sent. del et lith. Mintern Bros. imp.

1–5. ARCTURUS ANNA, Beddard. 6–12. ARCTURUS CORNUTUS, Beddard.

PLATE XX.

PLATE XX.

Figs. 1–11. ARCTURUS SPINOSUS.

Fig. 1. Male, dorsal aspect.

Fig. 2. Male, lateral aspect.

Fig. 3. Female, dorsal aspect.

Fig. 4. Female, lateral aspect.

Fig. 5. One of the posterior thoracic limbs of female.

Fig. 6. One of the posterior thoracic limbs of male.

Fig. 7. One of the anterior thoracic appendages of female.

Fig. 8. One of the anterior thoracic appendages of male.

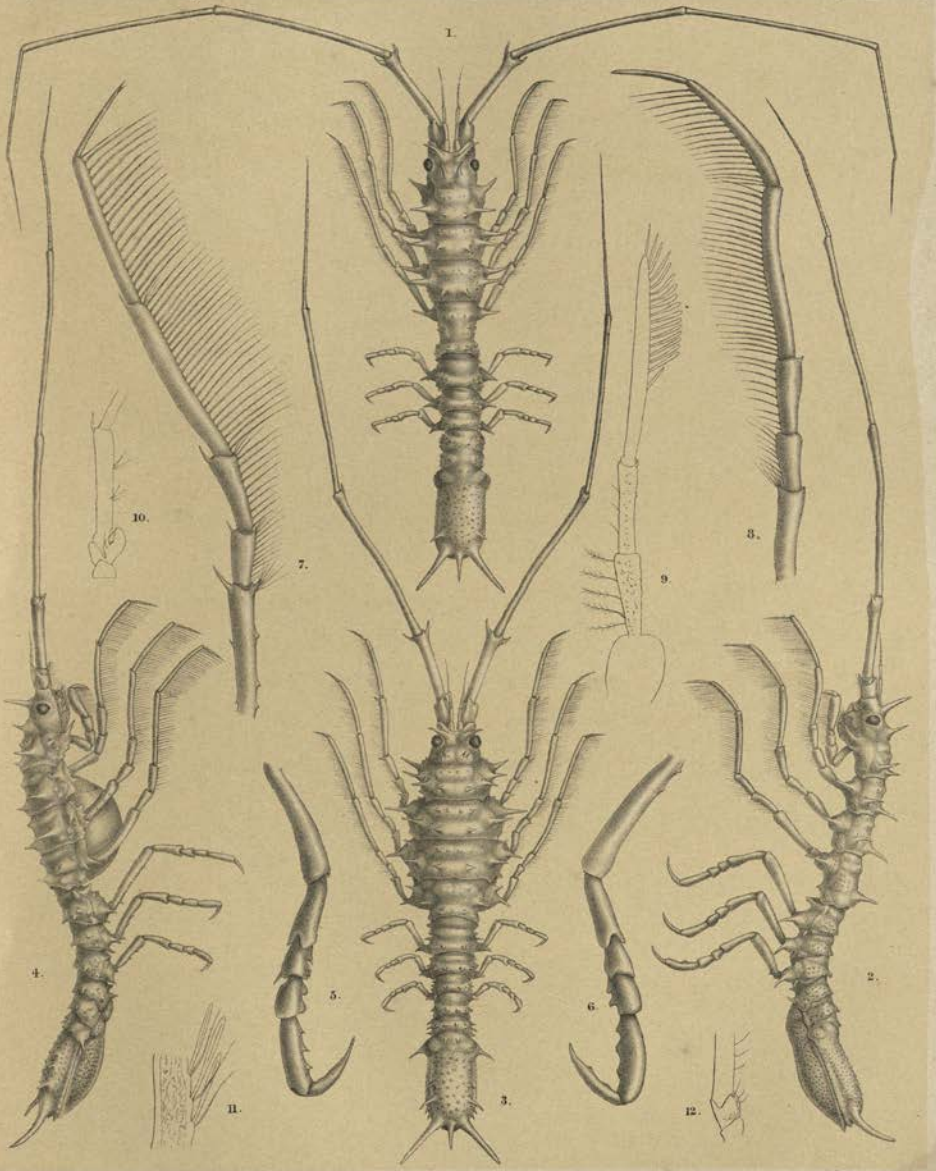
Fig. 9. Antennule.

Fig. 10. Basal joints of antenna.

Fig. 11. Portion of flagellum of antennule; more highly magnified.

Fig. 12. ARCTURUS BAFFINI.

Fig. 12. Basal joints of antenna.



P. Smit. del. et lith. Mintern. Bros. imp.

1–11. ARCTURUS SPINOSUS, Beddard. 12. ARCTURUS BAFFINI, Sabine.

PLATE XXI.

PLATE XXI.

Figs. 1–4. ARCTURUS GLACIALIS.

Fig. 1. Female, dorsal aspect.

Fig. 2. Female, lateral aspect.

Fig. 3. One of the anterior thoracic limbs.

Fig. 4. One of the posterior thoracic limbs.

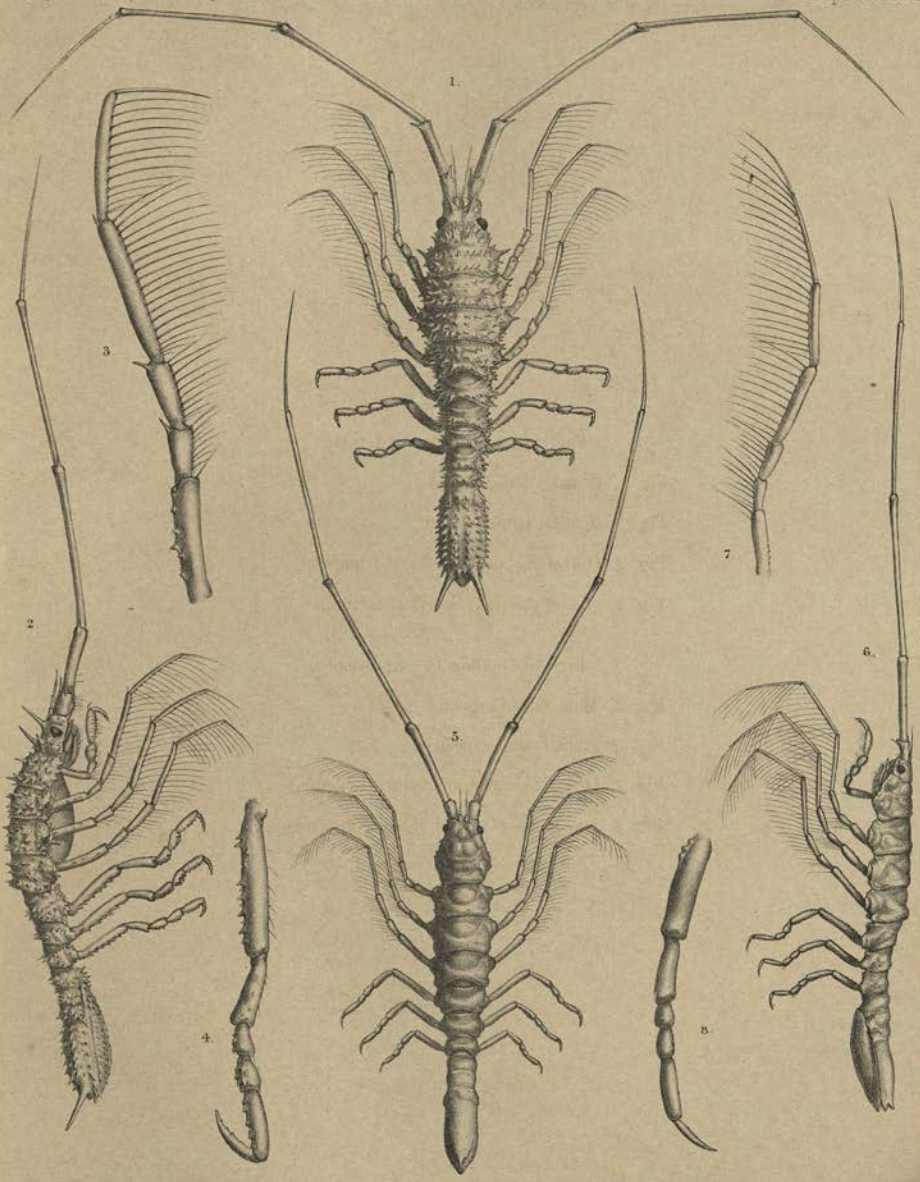
Figs. 5–8. ARCTURUS ABYSSICOLA.

Fig. 5. Male, dorsal aspect.

Fig. 6. Male, lateral aspect.

Fig. 7. One of the anterior thoracic appendages.

Fig. 8. One of the posterior thoracic appendages.



P. Sent. del. et lith. Mintern Bros. imp.

1—4. ARCTURUS GLACIALIS, Beddard. 5—8. ARCTURUS ABYSSICOLA, Beddard.

PLATE XXII.

PLATE XXII.

Figs. 1–4. ARCTURUS BRUNNEUS.

Fig. 1. Female, dorsal aspect.

Fig. 2. Female, lateral aspect.

Fig. 3. One of the anterior thoracic appendages.

Fig. 4. One of the posterior thoracic appendages.

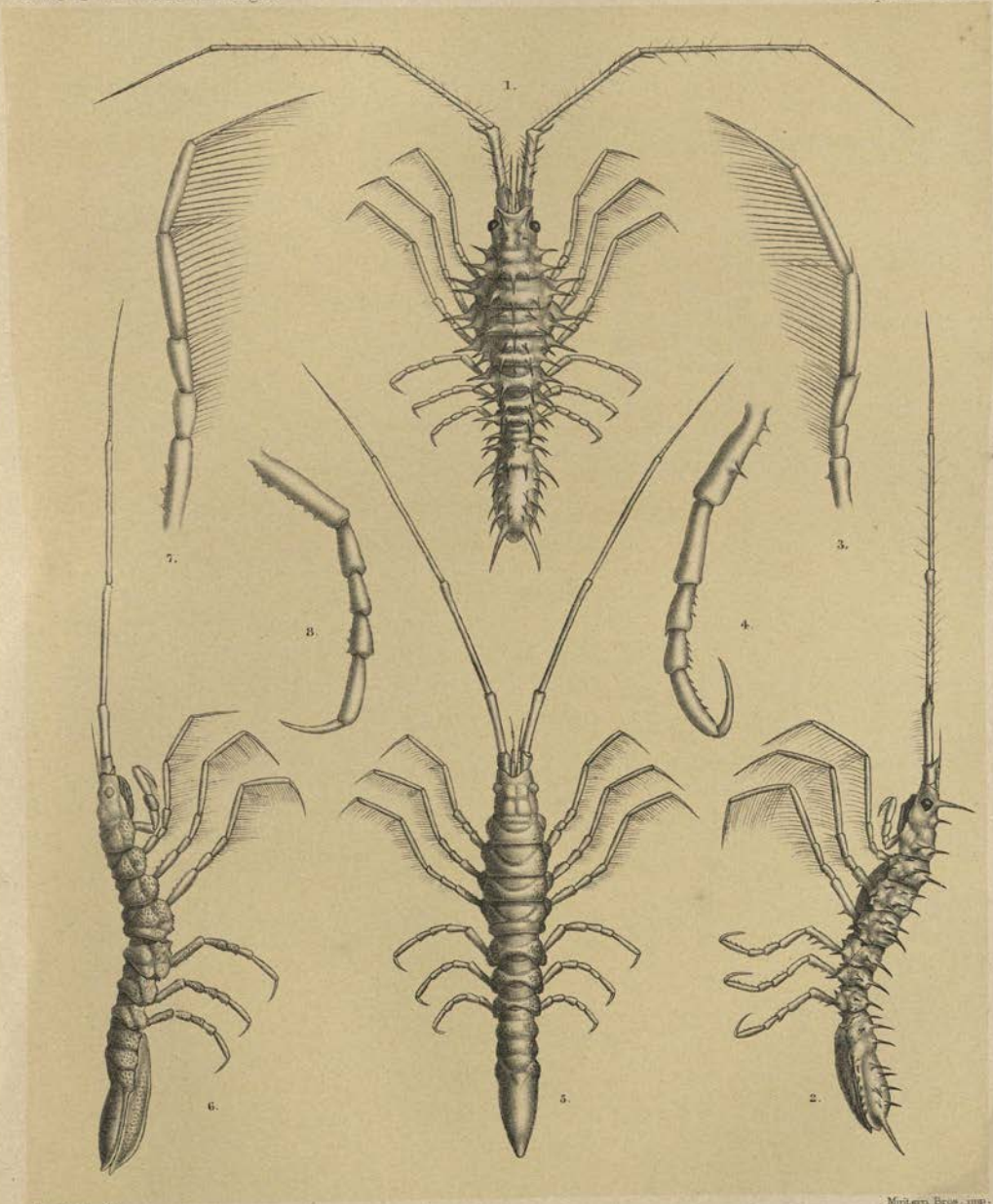
Figs. 5–8. ARCTURUS MYOPS.

Fig. 5. Male, dorsal aspect.

Fig. 6. Male, lateral aspect.

Fig. 7. One of the anterior thoracic appendages.

Fig. 8. One of the posterior thoracic appendages.



P. Smit del et lith. Mintern Bros. imp.

1–4. ARCTURUS BRUNNEUS, Beddard. 5–8. ARCTURUS MYOPS, Beddard.

PLATE XXIII.

PLATE XXIII.

Figs. 1–4. ARCTURUS STUDERI.

Fig. 1. Male, dorsal aspect.

Fig. 2. Male, lateral aspect.

Fig. 3. One of the anterior thoracic appendages.

Fig. 4. One of the posterior thoracic appendages.

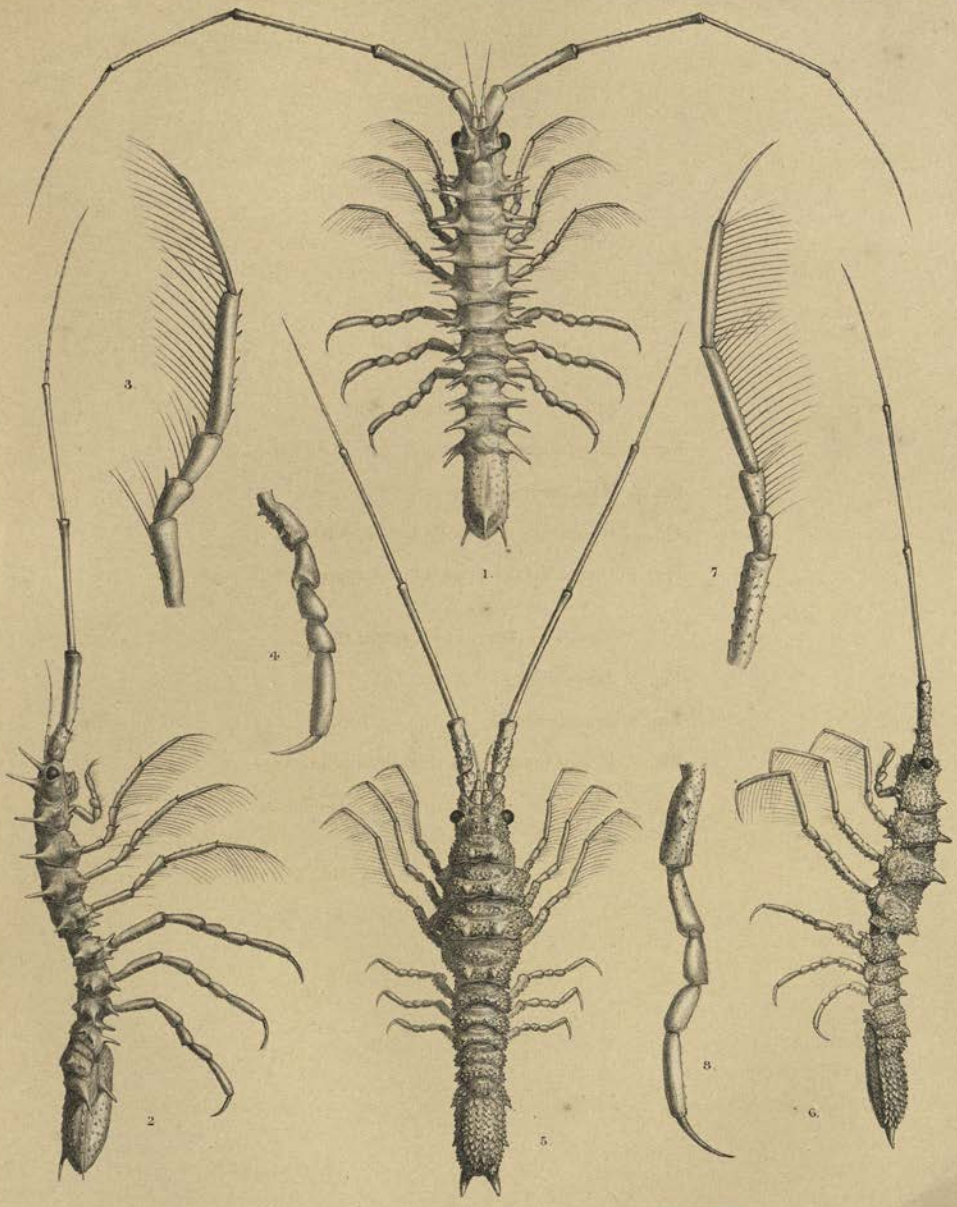
Figs. 5–8. ARCTURUS AMERICANUS.

Fig. 5. Dorsal view.

Fig. 6. Lateral view.

Fig. 7. One of the anterior thoracic appendages.

Fig. 8. One of the posterior thoracic appendages.



P. Smit del. et lith.

Mintern Bros. imp.

1–4. ARCTURUS STUDERI, Beddard.

5–8. ARCTURUS AMERICANUS, Beddard.

PLATE XXIV.

PLATE XXIV.

Figs. 1–4. ARCTURUS STEBBINGI.

Fig. 1. Dorsal aspect.

Fig. 2. Lateral aspect.

Fig. 3. One of the anterior thoracic appendages.

Fig. 4. One of the posterior thoracic appendages.

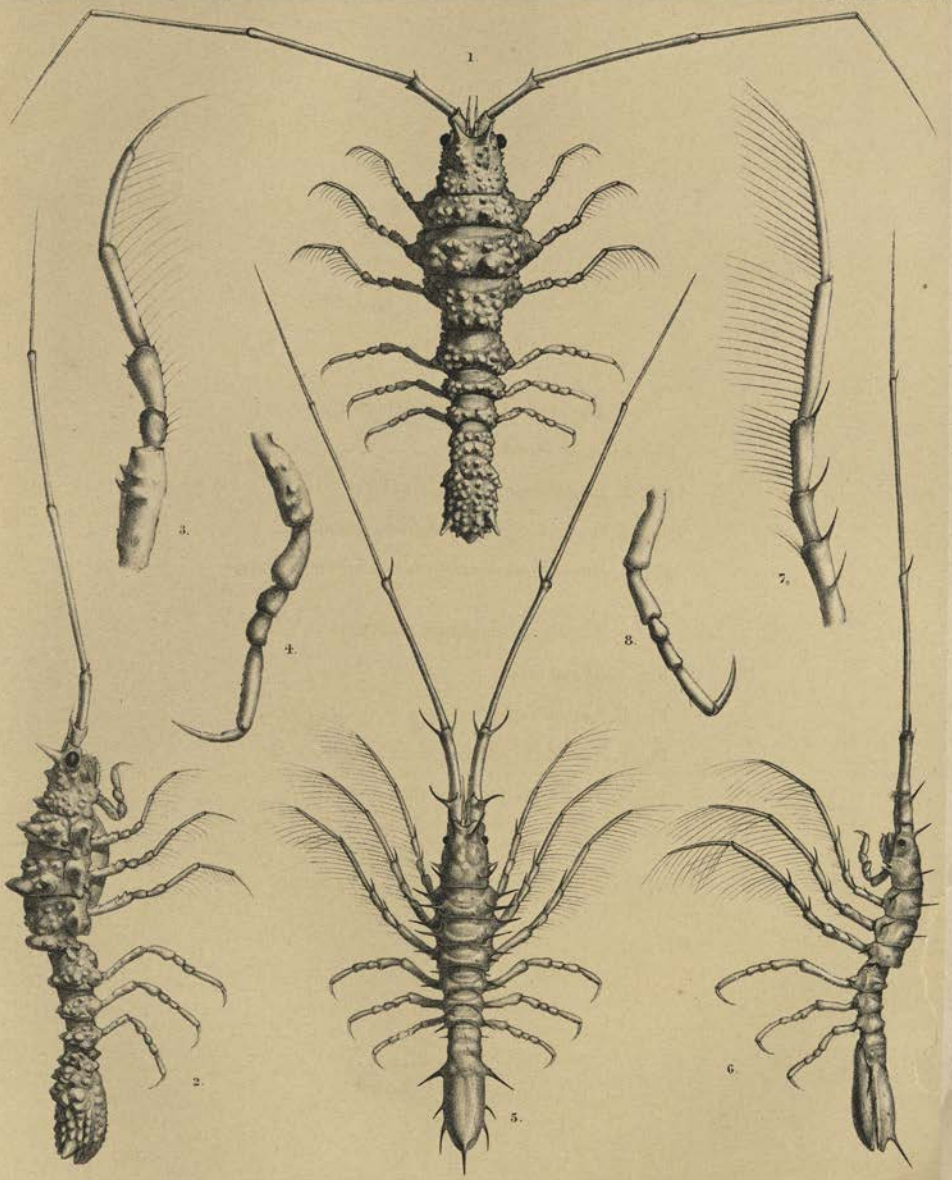
Figs. 5–8. ARCTURUS PURPUREUS.

Fig. 5. Dorsal aspect.

Fig. 6. Lateral aspect.

Fig. 7. One of the anterior thoracic limbs.

Fig. 8. One of the posterior thoracic limbs.



P. Smit del et lith.

Mintern Bros. imp.

1–4 ARCTURUS STEBBINGI, Beddard. 5–8 ARCTURUS PURPUREUS, Beddard.

PLATE XXV.

PLATE XXV.

Figs. 1–4. ARCTURUS OCULATUS.

Fig. 1. Female, lateral aspect.

Fig. 2. Antennule.

Fig. 3. Stalked eye and antenna.

Fig. 4. Portion of one of the joints of antenna.

Fig. 5. ASTACILLA MARIONENSIS.

Fig. 5. Lateral aspect.

Figs. 6, 7. ARCTURUS FURCATUS.

Fig. 6. Head and proximal joints of antenna.

Fig. 7. Head and proximal joints of antenna, ventral aspect.

Fig. 8. ARCTURUS MYOPS.

Fig. 8. Antenna.

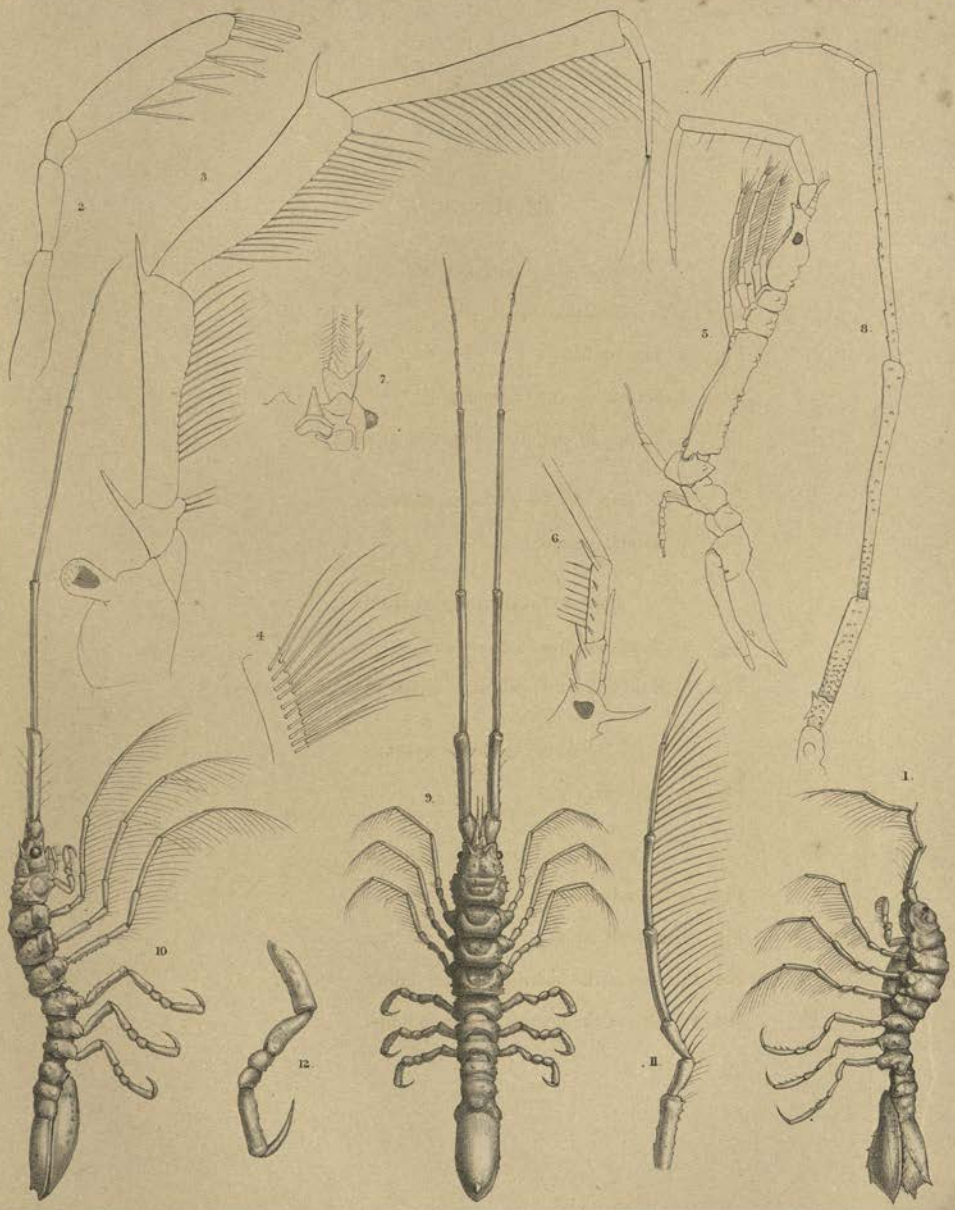
Figs. 9–12. ARCTURUS SPINIFRONS.

Fig. 9. Dorsal aspect.

Fig. 10. Lateral aspect.

Fig. 11. One of the anterior thoracic limbs.

Fig. 12. One of the posterior thoracic limbs.



P. Smit. del. et lith. Mintern Bros. imp.

1–4. ARCTURUS OCULATUS, Beddard. 5. ASTACILLA MARIONENSIS, Beddard. 6–7. ARCTURUS FURCATUS, Studer.
8. ARCTURUS MYOPS, Beddard. 9–12. ARCTURUS SPINIFRONS, Beddard.

120°
110°
100°
90°
80°
70°
60°
50°
40°
30°
20°
10°
0
10°
20°
30°
40°
50°
60°
Juan Fernandez
Valparaiso

THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY.

REPORT on the BRACHYURA collected by H.M.S. Challenger during the Years 1873-76. By EDWARD J. MIERS, F.L.S., F.Z.S.

INTRODUCTION.

THE Collection of Brachyura obtained during the Expedition of H.M.S. Challenger contains a large number of new and very interesting types, which deserve perhaps a fuller treatment than it has been found possible to give to their description and illustration. The groups assigned to me as Brachyura are those included in this group by Professors H. Milne Edwards and J. D. Dana, who may perhaps still be regarded as the leading authorities on the classification of the higher Crustacea, and the arrangement followed is, as regards the four principal subdivisions, that of those naturalists, although considerably modified as regards the minor groups.

In the present Report no attempt has been made to enter into the anatomical or palæontological affinities of the Brachyura,—subjects which it seemed to me should be left to those students of the group, who, by special training and experience, would be better qualified than myself to discuss them—but merely to furnish a systematic account of the numerous species collected, to amend and modify the classification where necessary, and to give lists as complete as possible, of the recent species of each genus, so far as these are not included in the works of MM. H. and A. Milne Edwards, Professor J. Bell, F.R.S., and others who have revised families or subfamilies of the Brachyura; the numerous genera have also been redescribed on a uniform system, and it is thus hoped that the Report will prove, in the absence of any catalogue of the group, of assistance both to present and future systematists, and a useful supplement to the monographs of A. Milne Edwards (the first living authority upon this special group of the Crustacea), and to the

Histoire naturelle des Crustacés; and may thus facilitate the preparation, at some future time, of a Catalogue of the Brachyura, a work much needed by all students of the higher Crustacea.

The collection itself was well suited to the preparation of a memoir of this kind, on account of the relatively large number of littoral and shallow-water forms represented in it from nearly all parts of the globe, the sorting, determining and incorporation of which with the collection of the Museum occupied much more of the time which was originally allotted to me for the preparation of the Report than was anticipated, and although this time was generously extended by Mr. John Murray, and no limitations whatever placed upon me in the performance of my task by the authorities of the British Museum, yet in its accomplishment I am conscious of having fallen far short of what might have been effected, on account of the weakness of my health, and the necessary duties which fell upon me as the assistant (until quite recently) in charge of the collection of Crustacea in that Institution.

With regard to the collection itself, as I have elsewhere noted,[1] the groups richest in new genera and species are the Oxyrhyncha (Maioidea) and Oxystomata (Leucosoidea), and to these belong most of the new forms collected at depths exceeding 100 fathoms. No Brachyurous crab occurs in those deepest abysses of the ocean (exceeding 2000 fathoms), where the Challenger dredgings have shown the lower forms of animal life may occur, and but very few at depths exceeding 500 fathoms. The localities furnishing the greatest proportion of new and interesting types are stations at, among, or near the Islands of the Malaysian Archipelago; *e.g.*, at the Philippine Islands (Station 210), at the Ki Islands (Station 192), at the Admiralty Islands (Station 219), and also at the Fijis (Station 173). Some interesting types were also taken on the Agulhas Bank off the South African coast (Station 142). For further details, I may refer to the List of Stations, and that indicating the bathymetrical distribution of the species.

As regards the geographical distribution of the species, a large number of the littoral and shallow-water species are widely distributed Atlantic or Indo-Pacific forms. Of the new species collected in deeper water, many, of course, are known from but a single locality, but instances are not wanting to show that of the species inhabiting deeper water some may also prove to have a wide geographical range; such are—*Lispognathus thomsoni* (Norman), and *Ebalia tuberculosa*, A. Milne Edwards. From a geographical point of view, the collection is interesting, also, as furnishing indications of the Crustacean fauna of localities hitherto rarely visited or unexplored by the carcinologist. I may instance the island of Fernando Noronha, where nine species were taken in shallow water, of which two are apparently undescribed. Also the range of some well-known species has been shown to be more extended than was hitherto known, as, *e.g.*, *Geocarcinus lagostoma*, Milne Edwards.

[1] Narr. Chall. Exp., vol. i. part ii. p. 585, 1885.

With regard to the terminology employed in the descriptions of new genera and species, I have found the simple divisions of the "regions" of the carapace, long ago indicated by Desmarest, and modified by H. Milne Edwards in 1834–40, sufficient for all practical purposes. These regions are (besides the frontal, orbital and antennal regions, and the epistoma) the gastric, cardiac and intestinal regions, situated in the median dorsal line, the hepatic, situated ordinarily behind the orbits and near to the antero-lateral margins of the carapace, the branchial regions, covering the whole of the postero-lateral parts of the dorsal surface, and the pterygostomian regions, situated on the inferior surface, and between the antero-lateral margins and the buccal cavity. The description of the carapace and post-abdomen is followed by that of the appendages and limbs in regular sequence, a complicated terminology being avoided wherever possible.

With regard to the synonymical citations, it has been thought sufficient, as a rule, in the case of well-known species, to refer to the original authority for the species and to a recognisable figure, also to the latest or principal authority for the group to which the species belongs, but the synonyma are occasionally given more fully when there has been anything to add or elucidate with regard to them.

Had health and time allowed, I had hoped to give a complete bibliographical list of the works and memoirs relating to the Brachyura, but health, which necessitated the resignation of my post in the British (Natural History) Museum, compelled also the abandonment of this idea, and I thought it right to place the manuscript of the Report in the hands of Mr. Murray for publication. The whole of the systematic part, which had been completed as far as the description of the genera and species was concerned, though not finally revised for press, was accordingly printed off before my health again permitted me to return to the subject. I have therefore found it impossible to insert many details that would have been desirable regarding the affinities and limitation of the various families and subfamilies, &c., and a few errors and omissions occur, which are referred to in the list of errata at the end of the Report; perhaps also the lists of species are not in all cases as complete as a thorough revision of the literature would have made them. I have to thank the Editor of the Reports, and Mr. T. Wemyss Fulton, M.B., of the Editorial Staff of the Challenger Office, for the care that was taken to render the text as correct as possible while the sheets were passing through the press.

The generic descriptions of the earlier part of the Report, relating to the Oxyrhyncha, and drawn up when I was much engaged with other work, might, perhaps, have been extended with advantage to embrace further structural details, and some of the earlier plates are inferior to the later in finish; nevertheless they will in all cases, it is hoped, serve the purpose for which they were intended, namely, to illustrate and identify the species; and my best thanks are due to Mr. R. Morgan for the pains which he at all times bestowed upon this work, in which he had had previously but little experience.

SYSTEMATIC CLASSIFICATION OF THE BRACHYURA.

In place of a complete bibliographical list I subjoin the following brief notice of the classifications proposed by the leading systematists. If time and opportunity had permitted, even this short abstract of the subject could have been with advantage treated in greater detail and thereby rendered more complete.[1]

Professor H. Milne Edwards, in 1834, in the first volume of his great work,[2] separated from the Brachyura of earlier authors, and designated Anomura, those forms in which the sternum is linear, and the post-abdomen is less closely inflexed beneath the sternal surface of the body, and bears more or less well-developed appendages upon the penultimate segment. He divided the restricted Brachyura into the four great natural groups or subdivisions, Oxyrhinques (Oxyrhyncha), Cyclomètopes (Cyclometopa), Catomètopes (Catometopa), and Oxystomes (Oxystomata), which have been retained by most succeeding authors, and are adopted in the present Report, with these modifications only, that I follow Professor Dana in placing the Thelphusinea (which are regarded by Milne Edwards as a tribe of the Catometopa) and the somewhat heterogeneous group Corystoidea in the Cyclometopa; the affinities of the Corystoidea, however restricted, seeming to be rather with the Oxyrhyncha and the Cyclometopa than with the Oxystomata where Milne Edwards places them.

This method of restricting the Brachyura, indicated in the Histoire naturelle des Crustacés, was apparently adhered to by Milne Edwards in 1852 in the article entitled "Observations sur les affinités zoologiques et la classification naturelle des Crustacés,"[3] where, however, the term Ocypodidæ is adopted for the group designated Catometopa in his earlier work, and an arrangement of the genera proposed, which I think to be in many particulars less natural and convenient to systematists than that of Dana, which appeared almost contemporaneously, and which in its turn has been modified by Dr. Stimpson and in the present Report.

It will be unnecessary to refer in further detail to the arrangement of the families and subfamilies indicated in the Histoire naturelle des Crustacés, a work which is in the hands of every student of the group.

De Haan, in 1835–1849, in his great work on the Crustacea of Japan,[4] which is a standard work of reference with all students of the Crustacea, divides the Brachyura into two great primary sections or groups, as follows:—(1) Brachygnatha, with the four subdivisions Cancroidea, Majacea, Dromiacea, and Trichidea, and (2) Oxystomata,

[1] Reference is made here only to those works which deal in a general way with the arrangement of the whole group, and not to several papers where special families or subfamilies are dealt with, nor, of course, to many memoirs relating to the faunæ of particular regions, or describing collections from special localities.

[2] Hist. Nat. des Crust., vol. i. pp. 247, 263, 1834.

[3] *Ann. d. Sci. Nat.*, ser. 3 (Zool.), xviii. p. 126, 1852.

[4] Crust. in v. Siebold, Fauna Japonica, Introd., p. xi., 1849.

including the groups Dorippidea, Calappidea, Matutoidea, Leucosidea, and Raninoidea. In the first named division (Brachygnatha) the subdivision Cancroidea includes not only the Cyclometopa, but also the Catometopa or Grapsoid Crabs, and the Corystoidea (Corystiens) of Milne Edwards.

This system, based in large measure upon the structure of the maxillipedes (upon the study and illustration of which in the different types of the Brachyura de Haan bestowed so much time and labour) has been adopted by few other authors.[1]

W. S. MacLeay in 1849 [2] somewhat fancifully divides the Brachyura into two primary sections, the first, Tetragonostoma, including the stirpes Pinnotherina, Grapsina, Cancrina, Parthenopina, and Inachina, the second, Trigonostoma, including the stirpes Dromiina, Dorippina, Corystina, Calappina, and Leucosina.

The value of the great subdivisions proposed by de Haan, and of his minor groups or genera, was discussed at length by Professor J. D. Dana in 1852, in the introduction to his elaborate Report on the Crustacea collected during the U.S. Exploring Expedition under Captain (Commodore) Wilkes, U.S.N.,[3] and the defects of his classification are pointed out. It will be unnecessary here to reproduce in detail the system of arrangement proposed by Dana, who not only characterised anew the families and subfamilies of the Brachyura, but gave diagnoses of all of the then known genera; it will be sufficient to note, that the four great groups of the Brachyura proposed by Milne Edwards are retained nearly as they were defined by that author, and the Dromiacea and Raninoidea, included by de Haan in the Brachyura, are restored to the Anomura. Dana's classification, as regards the subfamilies and minor subdivisions, has been considerably modified by A. Milne Edwards in 1861–65 as regards the Cancroidea,[4] and by myself in 1879 [5] as regards the Oxyrhyncha.

He divides the Oxyrhyncha into the legions Maiinea, Parthenopinea, and Oncininea, the latter section restricted to the genus *Oncinopus*, which in my revision of the group is placed near *Macrocheira* in the subfamily Inachinæ; the Cyclometopa or Cancroidea into the legions Cancrinea, Thelphusinea, and Cyclinea (the latter restricted to the genus *Acanthocyclus*); for the Catometopa and Oxystomata the division is into families only, for which I must refer to his Report; no primary sections or legions are established in these groups.

His subdivisions in the Oxyrhyncha, Cyclometopa, and Catometopa seem to me sometimes needlessly numerous, but his primary sections and his arrangement of the leading groups of the Oxystomata are followed in the present Report.

Professor Dana's system, offering as it does facilities for the classification and

[1] It was, however, followed by Dr. F. Krauss in his work entitled Die süd-afrikanischen Crustaceen, Stuttgart, 4to, 1843.

[2] Annulosa of South Africa in Smith's Illustr. of Zoology of South Africa, p. 54, 1849.

[3] Crust. in U.S. Explor. Exped., vol. xiii. (i.) pp. 69–75, 1852.

[4] Archives du Museum, vol. x. pp. 309–421, 1861; Nouvelles Archives du Museum, vol. i. pp. 177–308, 1865.

[5] *Journ. Linn. Soc. Lond.* (Zool.), vol. xiv. pp. 634–673, pls. xii., xiii., 1879.

determination of large collections beyond that of any other writer since the author of the Histoire naturelle des Crustacés, has been adopted by many later writers on the Crustacea, *e.g.*, by Dr. Heller, in 1865, in his Report on the Crustacea of the "Novara" Expedition,[1] and by Professor Targioni-Tozzetti in 1877, in the volume dealing with the Crustacea of the Italian steam corvette "Magenta,"[2] and by myself,[3] and by Mr. W. A. Haswell,[4] and other carcinologists. This full and exhaustive report must be regarded, after the Histoire Naturelle des Crustacés, as the work by which the study of the Crustacea, at least the systematic study of the recent Crustacea, has been most advanced.[5]

Professor A. Milne Edwards in 1860, in the introductory article prefixed to his Histoire des Crustacés Podophthalmaires Fossiles,[6] separated the Decapoda into two primary sections, the Brachyura and Macrura, in the first of which, the Brachyura, he included not only the groups included by M. H. Milne Edwards under that designation, but also the various Anomurous groups referred by the elder Milne Edwards to his family Anomoures Apterures. The remainder of the Anomura are referred by A. Milne Edwards in this important memoir to the Macrura. The family Anomures Apterures of H. Milne Edwards becomes, therefore, in the classification of A. Milne Edwards, the section des Brachyures anormaux (*tom. cit.*, p. 181). In similar manner, the section "*Brachyures proprement dits* or *Brachyures normaux*," which includes the groups constituting the Brachyura of H. Milne Edwards and of the present Report, is subdivided into two principal groups; in the first of which, Brachyures macrocephales, are included the Oxyrhyncha, Cyclometopa, Catometopa, and the greater part of the Oxystomata. The second section, Brachyures microcephales, characterised by the very small facial region, rudimentary eyes and epistoma, and the form of the branchial chambers (which are closed at the bases of the legs, and open externally only at the antero-lateral angles of the buccal cavity), is restricted to the single abnormal family Leucosiidæ.

The Brachyures macrocephales are further subdivided into two parallel series:—

(*a*) Eustomés, including the Cyclometopa, Catometopa, and Oxyrhyncha.

(*b*) Oligorhynques, including the Oxystomata, except the Leucosiidæ, and the Corystidæ.

This classification has been adopted by M. Brocchi, in 1875,[7] and also by M. F. Mocquard in 1883,[8] but has not been generally used, so far as I know, by systematists;

[1] Reise der Œsterreichischen Fregatte "Novara," Zoologischer Theil, Crustaceen, 1867.

[2] Crostacei Brachiuri and Anomuri in Zoologia del Viaggio intorno al globo della R. piro-corvetta, "Magenta," 8vo, Firenze, 1877.

[3] Catalogue of the stalk and sessile-eyed Crustacea of New Zealand, 8vo, London, 1876.

[4] Catalogue of the Australian stalk and sessile-eyed Crustacea, 8vo, Sydney, 1882.

[5] For some later remarks on the classification of the Crustacea and of the relationship existing between the Brachyura and Anomura see a memoir by Professor Dana, in the *Amer. Journ. Sci. and Arts* for 1856, p. 14.

[6] *Ann. d. Sci. Nat.*, ser. 4 (Zool.), vol. xiv. p. 175, 1860.

[7] Recherches sur les organes génitaux males des Crustacés Decapodes, *Ann. d. Sci. Nat.*, ser. 6 (Zool.), vol. ii. Art. 2, 1875.

[8] Recherches anatomiques sur l'estomac des Crustacés Podophthalmaires, *op. cit.*, vol. xvi. Art. 1, 1883.

it, in several ways, however, brings into greater prominence true natural affinities existing between the different groups; as, *e.g.*, in the approximation of the Oxyrhyncha to the Oxystomata, and perhaps in the definite separation of the Leucosiidæ from the latter group, nor can it be denied that the Dromiidæ, at least, are so nearly related to the Brachyura that they may with almost equal justice be arranged with them or with the Anomura. Perhaps, therefore, this classification will upon further study be adopted by systematists in preference to the older one, which is followed in the present Report.

The classification proposed in 1861 by Dr. Strahl,[1] who, basing his system upon the modifications of the structure and the position of the exterior antennæ and especially of the basal joint, proposed four entirely new subdivisions of the Brachyura designated (1) Orbata, (2) Liberata, (3) Incuneata, and (4) Perfusa, needs no extended remark. The artificiality of his arrangement, and the inconvenience resulting from the dismemberment of the long-established groups, was exposed shortly after by the late Dr. W. Stimpson,[2] the well-known American carcinologist, and it is to be regretted that the minor subdivisions of the Brachyura indicated by this author in his Preliminary Synopsis of the Crustacea collected by the U.S. Exploring Expedition to the North Pacific[3] were never fully recharacterised, and the classification never worked out in detail. This latter remark applies also to his memoir on the Crustacea dredged in the Florida Straits,[4] where such definitions as are given are brief and incomplete.

Several of the families and subfamilies indicated, but not always properly defined, by Stimpson, are adopted in the present Report.

Dr. Camil Heller in 1863[5] limited the Brachyura in the sense indicated by M. H. Milne Edwards and Dana, and retains the four great subdivisions, Oxyrhyncha, Cyclometopa, Catometopa, and Oxystomata. Dana's family Eriphiidæ is not sustained; and the Corystoid genera *Atelecyclus*, *Thia*, and *Corystes* are classed with the Oxystomata as in H. Milne Edwards' system.

Professor C. Claus in his Zoologie[6] divides the Brachyura into five tribes:—(1) Notopoda (including not only the Dorippidæ, but also the groups Porcellanidæ, Lithodidæ, and Dromiidæ, which have been generally included in the Anomura); (2) the Oxystomata, including besides the groups referred to this tribe by Dana, the Anomurous family Raninidæ; (3) the Oxyrhyncha (Majacea); (4) the Cyclometopa (Arcuata) or Cancroidea; and (5) the Catometopa. The three last groups are limited as by Professor Dana; the Corystidæ and the Thelphusidæ are included in the Cyclometopa.

[1] *Monatsber. d. k. preuss. Akad. d. Wiss. Berlin*, pp. 713, 1004, 1862.

[2] *Amer. Journ. Sci. and Arts*, vol. xxxv. p. 139, 1863; *Ann. and Mag. Nat. Hist.*, ser. 3, vol. xi. p. 233, 1863.

[3] Prodromus descriptionis Animalium evertebratorum, &c., *Proc. Acad. Nat. Sci. Philad.*, 1857, p. 216; 1858, pp. 31, 93, 159.

[4] *Bull. Mus. Comp. Zoöl.*, vol. ii. p. 109, 1870.

[5] Die Crustaceen des südlichen Europa, Wien, 1863, 8vo.

[6] Grundzüge der Zoologie, 4ter Auflage, Bd. i. p. 632, 1880.

The remainder of the Anomura (Hippidæ, Paguridæ, Galatheidæ) are included by Dr. Claus in the Macrura.[1]

Dr. E. Nauck, in 1880,[2] who based his classification on the solid stomachal plates of the Brachyura, proposed to divide this group into the following sections:—

I. Heterodonta (to include the Gelasimidæ, &c., and Pinnotheridæ).

II. Cyclodonta; subdivided as follows:—

A. Cœlostylidea, including the Catometopa of Milne Edwards (except the Gelasimidæ and Pinnotheridæ), and the Oxyrhyncha, Milne Edwards.

B. Platystylidea, including the Oxystomata, Milne Edwards; and Cyclometopa, Milne Edwards.

Trapezia, in which the structure of these parts is very peculiar, is separated from the remainder of the Cyclometopa and establishes a connecting link with the Heterodonta. This classification is not very natural or convenient, and is not followed by M. F. Mocquard in his elaborate memoir referred to above.

By J. E. V. Boas, 1880,[3] the Dromiidæ are included with the Brachyura, and the group is divided into (*a*), Brachyura genuina (=Brachygnatha, de Haan, except the Dromiacea and the Oxygnatha) and (*b*), Dromiacea. This author regards the group Oxystomata as of doubtful value.

In the classification adopted in the following pages, a synoptical view of which is given below, the arrangement followed is generally that of Professor Dana, so far as the leading subdivisions are concerned.

In subdividing the Oxyrhyncha, I have adopted the arrangement indicated by myself in a memoir submitted to the Linnean Society in 1879.[4]

As regards the Cancroid Cyclometopa, I have followed Professor A. Milne Edwards in his monograph, unfortunately never completed, of the Canceridæ,[5] in not sustaining Dana's family Eriphiidæ, but have not ventured to propose any detailed classification of the genera which are not very numerously represented in the Challenger collection. The Trapeziinæ, which are placed in a separate section, should probably rank as a distinct family intermediate between the Cyclometopa and Catometopa.

As regards the swimming crabs (Portunidæ), I follow A. Milne Edwards[6] in uniting

[1] This classification has been followed by J. V. Carus in his recently published Prodromus Faunæ Mediterraneæ (Arthropoda), Stuttgart, 1885.

[2] Das Kaugerüst der Brachyuren, *Zeitschr. f. wiss. Zool.*, Bd. xxxiv. pp. 17, 24, 64, 1880.

[3] Studier over Dekapodernes Slaegtskabsforhold, *Dansk. Vidensk. Selsk. Skriv.* (6te R.), Bd. i., ii., pp. 141, 159, 200, 202, 1880.

[4] On the classification of the Maioid Crustacea or Oxyrhyncha, *Journ. Linn. Soc. Lond.* (Zool.), vol. xiv. pp. 634–673, pl. xii.–xiii., 1879.

[5] Etudes Zoologiques sur les Cancériens, *Nouv. Archiv. Mus. Hist. Nat.*, i. pp. 177–308, pls. xi.–xix., 1865.

[6] Etudes Zoologiques sur les Crustacés recents de la famille des Portuniens, *Archiv. Mus. Hist. Nat.*, x. pp. 309–428, pls. xxviii.–xxxviii., 1861.

Dana's families Portunidæ and Platyonychidæ, and the new arrangement of the genera, in which I have reduced the number of the subfamilies, is a modification of that indicated by the eminent French carcinologist.

In the Catometopa, or Grapsoid Crabs, the increase in the number of the genera in the family Ocypodidæ necessitated a revision of their classification, and I have accordingly proposed a new arrangement, differing alike from that of Dana and of H. Milne Edwards in 1852–54.[1]

Here, also, I have somewhat reduced and recharacterised the subfamilies, regarding as sectional divisions several which have been proposed, and thereby, it is hoped, simplifying the arrangement. Dana's family, Mycteridæ, is not sustained.

In the Pinnotheridæ, I have constituted a new subfamily, Hexapodinæ, for those curious forms in which the fifth ambulatory legs are rudimentary or aborted. The arrangement of the Ocypodoidea now proposed agrees much more nearly with Dana's than with that of Professor Milne Edwards, by whom the genera *Mycteris*, *Scopimera* and *Dotilla* (*Doto*) are separated from the Pinnotheridæ. In uniting these three genera as a distinct subfamily, Mycterinæ, of the Pinnotheridæ, I have, I trust, violated no natural affinities, but rather relegated them to their true position in the system.

In the Oxystomata, a somewhat heterogeneous group, which it will perhaps be found hereafter impossible to sustain in its entirety,[2] the arrangement followed is, as already stated, that of Dana. In rearranging the genera of the Leucosiidæ, however, I have thought it advisable to establish two new subfamilies, pending a more thorough revision of the subject than time and opportunity allowed to be made in the present Report.

[1] *Cf.* Milne Edwards' Memoire sur la famille des Ocypodiens, *Ann. d. Sci. Nat.*, Zool., ser. 3, vol. xviii. pp. 128–164, pls. iii., iv., 1852 ; vol. xx. pp. 163–224, pls. vi.–xi., 1853.

[2] The diagnosis of this group, which was wanting in the MSS. when sent to Edinburgh, is supplied in the appendix to the Report.

BRACHYURA.

OXYRHYNCHA or MAIOIDEA.

Oxyrhynchi, Latreille (pt.).
Oxyrhinques et *Cancériens Crytopodes*, Milne Edwards.
Maioidea vel *Oxyrhyncha*, Dana.

Legion I. MAIINEA, Dana.

Family I. INACHIDÆ, Miers.

Subfamily 1. LEPTOPODIINÆ, Miers.

Challenger Genera—

Leptopodia, Leach.
Metoporaphis, Stimpson.
Stenorhynchus, Lamarck (pt.).
Achæus, Leach.
Podochela, Stimpson, with *Coryrhynchus*, Kingsley (= *Podonema*, Stimpson) subgenus (?).

Subfamily 2. INACHINÆ.

Eurypodidæ, Stimpson.

Challenger Genera—

Platymaia, n. gen.
Cyrtomaia, n. gen.
Apocremnus, A. Milne Edwards.
Achæopsis, Stimpson.
Inachus, Fabricius (pt.).
Oncinopus, de Haan.
Eurypodius, Guérin-Méneville.
Gonatorhynchus, Haswell.
Anamathia, Smith (= *Amathia*, Roux).
Lispognathus, A. Milne Edwards (= *Dorhynchus*, Norman).
Ergasticus, A. Milne Edwards.
Echinoplax, n. gen.
Macrocheira, de Haan.

Subfamily 3. ACANTHONYCHINÆ.

Acanthonychidæ, Stimpson.

Challenger Genera—

Huenia, de Haan.
Menæthius, Milne Edwards.
Oxypleurodon, n. gen.
Dehaanius, MacLeay.
Pugettia, Dana.
Acanthonyx, Latreille.

Family II. MAIIDÆ, Miers.

Subfamily 1. MAIINÆ.

Maiens cryptophthalmes, Milne Edwards (pt.).

Challenger Genera—

Egeria, Leach (*Leptopus*, Lamarck, pt.).
Chorilibinia, Lockington.
Hyas, Leach.
Herbstia, Milne Edwards (= *Rhodia*, Bell; *Micropisa*, Stimpson) with subgenus *Herbstiella*, Stimpson.
Chlorinoides, Haswell.
Pisa, Leach (? = *Arctopsis*, Lamarck).
Hyastenus, White (= *Chorilia*, Dana; *Lahaina*, Dana).
Naxia, Milne Edwards (= *Naxioides*, A. Milne Edwards; *Podopisa*, Hilgendorf).
Scyra, Dana.
Notolopas, Stimpson.

Subfamily 2. SCHIZOPHRYSINÆ, Miers.

Challenger Genus—

Schizophrys, White (= *Dione*, de Haan, *nom. præocc.*).

Subfamily 3. MICIPPINÆ, Miers.

Challenger Genera—

Pseudomicippa, Heller (? = *Microhalimus*, Haswell). | *Micippa*, Leach.

Family III. PERICERIDÆ, Miers.

Maiens cryptophthalmes, Milne Edwards (pt.).

Subfamily 1. PERICERINÆ.

Pericerinæ, Stimpson.

Challenger Genera—

Libinia, Leach.
Pericera, Latreille.
Picroceroides, n. gen.

Macrocœloma, Miers.
Microphrys, Milne Edwards (= *Milnia*, Stimpson; *Perinea*, Dana; *Fisheria*, Lockington).

Subfamily 2. MITHRACINÆ.

Mithracinæ, Stimpson.

Challenger Genus—

Mithrax, Latreille, with subgenera *Nemausa*, A. Milne Edwards, and *Mithrax*, Latreille (= *Mithrax* and *Mithraculus*, Miers, and *Teleophrys*, Stimpson).

Legion II. PARTHENOPINEA, Dana.

Family IV. PARTHENOPIDÆ.

Parthenopiens et *Cancériens cryptophthalmes*, Milne Edwards.

Subfamily 1. PARTHENOPINÆ, Miers.

Challenger Genera—

Lambrus, Leach, with the subgenera *Lambrus* (= *Platylambrus*, Stimpson, pt.; *Rhinolambrus*, A. Milne Edwards, pt.); *Aulacolambrus*, A. M. Edwards; and *Parthenolambrus*, A. Milne Edwards (= *Parthenopoides*, Miers).

Cryptopodia, Milne Edwards.
Heterocrypta, Stimpson.

Subfamily 2. EUMEDONINÆ, Miers.

Challenger Genus—

Ceratocarcinus, Adams and White.

CYCLOMETOPA or CANCROIDEA.

Cyclomētopes, Milne Edwards (pt.).
Cancroidea, Dana (pt.).
Cyclometopa, Miers, Cat. New Zealand Crust.

Legion I. CANCRINEA, Dana.

Family I. CANCRIDÆ.

Cancridæ et *Eriphidæ*, Dana.
Cancériens, Milne Edwards and A. Milne Edwards.

Section I. Cancrinæ.

Cancériens arqués, Milne Edwards.
Cancériens quadrilatères, Milne Edwards (pt.).

Challenger Genera—

Cancer, Lamarck.
Carpilius, Desmarest.
Atergatis, de Haan.
Lophactæa, A. Milne Edwards.
Lophozozymus, A. Milne Edwards.
Medæus, Dana.
Actæa, de Haan.
Atergatopsis, A. Milne Edwards.
Xantho, Leach.
Xanthodes, Dana.
Panopeus, Milne Edwards.
Micropanope, Stimpson.
Etisus, Milne Edwards (pt.).
Carpilodes, Dana.
Zozymus, Leach.
Actæodes, Dana.
Leptodius, A. Milne Edwards.
Phymodius, A. Milne Edwards.
Eurytium, Stimpson.
Pseudozius, Dana (subgenus *Euryozius*, nov.).
Sphærozius, Stimpson.
Pilumnus, Leach.
Eriphia, Latreille.

Section II. Trapeziinæ.

Trapézides, A. Milne Edwards.

Challenger Genus—

Trapezia, Latreille.

Family II. PORTUNIDÆ.

Portunidæ et *Platyonychidæ*, Dana.
Portuniens, Milne Edwards and A. Milne Edwards.

Section I. Portuninæ.

Portuniens normaux, A. Milne Edwards.

Challenger Genera—

Neptunus, de Haan (subgenera *Amphitrite*, de Haan; *Achelous*, de Haan; *Hellenus*, A. Milne Edwards).
Xiphonectes, A. Milne Edwards.
Scylla, de Haan.
Cronius, Stimpson.
Goniosoma, A. Milne Edwards.
Thalamonyx, A. Milne Edwards.
Thalamita, Latreille.
Lupocyclus, Adams and White (subgenus *Parathranites*, nov.).
Platyonychus, Latreille (pt.).
Portunus, Fabricius.
Lissocarcinus, Adams and White.

Section II. Podophthalminæ.

Portuniens anormaux, A. Milne Edwards.

Challenger Genus—

Podophthalmus, Lamarck.

Legion II. CYCLINEA, Dana.

Challenger Genus—

Acanthocyclus, Milne Edwards and Lucas.

Legion III. CORYSTOIDEA.

Corystoidea, Dana.
Corystiens, Milne Edwards.

Challenger Genera—

Hypopeltarium, nov. (= *Peltarion*, Jacquinot and Lucas).
Gomeza, Gray.

Legion IV. THELPHUSINEA.

Thelphusiens, Milne Edwards.

Challenger Genus—

Thelphusa, Latreille (subgenera *Potamonautes*, MacLeay; *Geothelphusa*, Stimpson).

CATOMETOPA or OCYPODIIDEA

Catomètopes, Milne Edwards (pt.).
Grapsoidea, Dana.
Ocypodiens, M. Edwards, 1852–53.
Catometopa, Miers, Cat. New Zealand Crust., p. 32.

Family I. GEOCARCINIDÆ.

Gécarciniens, Milne Edwards.
Gecarcinidæ, Dana.

Challenger Genera—

Geocarcinus, Leach. | *Cardiosoma*, Latreille

Family II. OCYPODIDÆ.

Ocypodiens, Milne Edwards.
Macrophthalmidæ (pt.), Dana.

Subfamily 1. CARCINOPLACINÆ.

Challenger Genera—

Geryon, Kröyer.
Pilumnoplax, Stimpson.
Bathyplax, A. Milne Edwards.
Litocheira, Kinahan.
Ceratoplax, Stimpson.
Notonyx, A. Milne Edwards.

Subfamily 2. OCYPODINÆ.

Challenger Genera—

Ocypoda, Fabricius.
Gelasimus, Latreille.
Gonoplax, Leach.
Ommatocarcinus, White.
Macrophthalmus, Latreille.
Hemiplax, Heller.
Euplax, Milne Edwards (subgenus *Chænostoma*, Stimpson).

Family III. GRAPSIDÆ.

Grapsoidiens, Milne Edwards.
Grapsidæ, Dana.

Subfamily 1. GRAPSINÆ.

Challenger Genera—

Nautilograpsus, Milne Edwards.
Grapsus, Lamarck.
Leptograpsus, Milne Edwards.
Metopograpsus, Milne Edwards.
Pachygrapsus, Randall.
Geograpsus, Stimpson.
Pseudograpsus, Milne Edwards.
Platygrapsus, Stimp
Brachynotus, de Ha
Varuna, Milne Edw
Epigrapsus, Heller.
Goniopsis, de Haan.
Helice, de Haan.
Sesarma, Say.

Subfamily 2. PLAGUSIINÆ.

Challenger Genus—

Plagusia, Latreille.

Family IV. PINNOTHERIDÆ

Pinnothériens, Milne Edwards.

Subfamily 1. PINNOTHERINÆ.

Challenger Genus—

Pinnotheres, Latreille.

Subfamily 2. MYCTERINÆ.

Challenger Genus—

Mycteris, Latreille.

Subfamily 3. HYMENOSOMINÆ.

Hymenosominæ, Milne Edwards.
Hymenicinæ, Dana.

Challenger Genera—

Hymenosoma, Desmarest. | *Halicarcinus*, White (= *Liriopea*, Nicolet).

OXYSTOMATA or LEUCOSIIDEA.

Orbiculata, Latreille (pt.).
Oxystomes, Milne Edwards (pt.).
Leucosoidea vel *Oxystomata*, Dana.

Family I. CALAPPIDÆ.

Calappiens (pt.), Milne Edwards.
Calappidæ, Dana.

Subfamily CALAPPINÆ, Dana.

Challenger Genera—

Calappa, Fabricius (= *Lophos*, *Gallus*, de Haan, subgenera).
Paracyclöis, n. gen.
Mursia, Desmarest (= *Thealia*, Lucas).
Cryptosoma, Brullé (= *Cyclöes*, de Haan).

Family II. MATUTIDÆ, Dana.

Subfamily MATUTINÆ.

Challenger Genus—

Matuta, Fabricius.

Family III. Leucosiidæ.

Leucosiens, Milne Edwards.
Leucosiidæ, Dana.

Subfamily 1. Iliinæ.

Ilinæ, Stimpson.
Ebaliinæ, Stimpson.

Challenger Genera—

Myrodes, Bell.
Arcania, Leach (= *Iphis*, Leach).
Ixa, Leach.
Iliacantha, Stimpson.
Ebalia, Leach (= *Bellidilia*, Kinahan; *Phlyxia*, Leach).
Persephona, Leach (= *Guia*, Milne Edwards).
Myra, Leach.
Randallia, Stimpson.
Lithadia, Bell.
Merocryptus, A. Milne Edwards.
Philyra, Leach.

Subfamily 2. Leucosiinæ.

Challenger Genus—

Leucosia, Fabricius.

Family IV. Dorippidæ.

Dorippiens, Milne Edwards (pt.).
Dorippidæ, Dana.

Challenger Genera—

Dorippe, Fabricius.
Ethusa, Roux (with *Ethusina*, Smith, subgenus).
Cymopolia, Roux.

GEOGRAPHICAL DISTRIBUTION

STATION LIST,

SHOWING THE LOCALITIES AT WHICH BRACHYURA WERE COLLECTED DURING THE EXPEDITION, WITH THE NAMES OF THE SPECIES OBTAINED AT EACH.

As in my former Memoirs, four principal regions under which the higher Crustacea (or at least the littoral and shallow-water forms) may be distributed are distinguished. They are (1) the Arctic or Boreal Circumpolar Region (not represented by any species in the collection of H.M.S. Challenger); (2) the Atlantic Region; (3) the Oriental or Indo-Pacific Region; and (4) the Antarctic or Austral Circumpolar Region. In the present Report I have found it convenient to include in the latter region the species obtained south of 40° S. lat.; those obtained at the Cape of Good Hope and on the Agulhas Bank are included in the Atlantic Region, to which their affinities show they decidedly belong. The only Brachyurous Crab distributed throughout the Antarctic Region is *Halicarcinus planatus*, Fabricius. Of these regions, Nos. 1, 3 and 4 were established by Dana.[1]

The Atlantic Region includes not only the European Kingdom of Dana, but also in parts the Occidental Kingdom of that author, since it will embrace the Crustacean fauna of the West Indian Seas and of the eastern shores of the American Continent. Should this designation be generally adopted, it may be found convenient to restrict Dana's Occidental Region to the west coast of America and Islands adjacent, for the Crustacean fauna of these coasts must be regarded as upon the whole distinct from that of the Indo-Pacific Region, although the researches of naturalists are always adding to the number of species common to that Region and the Indo-Pacific and Atlantic Regions.

ATLANTIC REGION.

Tenerife, 78 fathoms.

Pisa (*Arctopsis*) *tribulus* (Linné).

Neptunus (*Amphitrite*) *hastatus* (Linné). This species was perhaps obtained at the next-mentioned locality.

[1] See the Appendix to his Report on the Crustacea of the U.S. Exploring Expedition, p. 1554, 1853.

Off Gomera, Canary Islands, 75 fathoms.

Xanthodes melanodactylus, A. Milne Edwards

Madeira.

Leptopodia sagittaria (Fabricius).

Azores, near Fayal, 50 to 90 fathoms.

Inachus leptochirus, Leach.
Pisa (*Arctopsis*) *tribulus* (Linné).
Lambrus (*Parthenolambrus*) *massena*, Roux.
Lambrus (*Parthenolambrus*) *expansus*, Miers.
Heterocrypta maltzani, Miers.
Xanthodes melanodactylus, A. Milne Edwards.
Pilumnus spinifer, Milne Edwards.
Portunus corrugatus (Pennant).
Calappa granulata (Linné).

STATION 73.—Azores, 1000 fathoms; June 30, 1873; lat. 38° 30′ 0″ N., long. 31° 14′ 0″ W.; bottom, Pteropod ooze; bottom temperature, 39°·4. Dredged.

Ethusa microphthalma, Smith.

STATION 75.—Azores, off Fayal, 450 fathoms; July 2, 1873; lat. 38° 38′ 0″ N., long. 28° 28′ 30″ W.; bottom, volcanic mud. Dredged.

Heterocrypta maltzani, Miers.

St. Vincent, Cape Verde Islands.

Leptopodia sagittaria (Fabricius).
Acanthonyx lunulatus (Risso).
Herbstia rubra, A. Milne Edwards.
Herbstia violacea (A. Milne Edwards).
Herbstia ovata, Stimpson.
Lambrus (*Parthenolambrus*) *massena*, Roux.
Lambrus (*Parthenolambrus*) *massena*, Roux, var. *atlanticus*, Miers.
Xanthodes melanodactylus, A. Milne Edwards.
Leptodius punctatus, Miers.
Pilumnus africanus, A. Milne Edwards.
Portunus corrugatus (Pennant).
Ocypoda cursor (Linné)
Grapsus maculatus (Catesby).
Pachygrapsus transversus, Gibbes.
Plagusia depressa, Fabricius.
Calappa gallus (Herbst).
Cryptosoma cristatum, Brullé.
Cymopolia caronii, Roux.

Cape Verde Islands, Porto Praya, St. Iago.

Cardiosoma armatum, Herklots. | *Ocypoda cursor* (Linné).

Ascension Island.

Pseudozius bouvieri, A. Milne Edwards, var. *mellissii*, Miers. | *Geocarcinus lagostoma*, Milne Edwards.

Grapsus maculatus (Catesby).

West North Atlantic (Gulf weed).

Neptunus sayi, A. Milne Edwards.

STATION 33.—Bermudas, 435 fathoms; April 4, 1873; lat. 32° 21′ 30″ N., long. 64° 35′ 55″ W.; bottom, coral mud. Dredged.

Geryon incertus, n. sp.

STATION 48.—South of Nova Scotia, 51 fathoms; May 8, 1873; lat. 43° 4′ 0″ N., long. 64° 5′ 0″ W.; bottom, rock. Dredged.

Hyas aranea (Linné). | *Hyas coarctata*, Leach.

STATION 49.—South of Nova Scotia, 85 fathoms; May 20, 1873; lat. 43° 3′ 0″ N., long. 63° 39′ 0″ W.; bottom, gravel, stones; bottom temperature, 35°·0. Dredged.

Hyas coarctata, Leach. | *Neptunus sayi*, A. Milne Edwards.

Bermuda, shallow water and shore.

Podochela riisei (Stimpson).
Macrocœloma trispinosa (Latreille).
Microphrys bicornutus (Latreille).
Mithrax (*Nemausa*) *rostrata*, A. Milne Edwards.
Mithrax forceps, A. Milne Edwards.
Lophactæa lobata (Milne Edwards).
Panopeus herbstii, var. *serratus* (de Saussure).
Eriphia gonagra (Fabricius).
Neptunus (*Achelous*) *depressifrons* (Stimpson).
Geocarcinus lagostoma, Milne Edwards.
Cardiosoma guanhumi, Latreille.
Ocypoda arenaria (Catesby).
Grapsus maculatus (Catesby),
Pachygrapsus transversus, Gibbes.
Calappa flammea (Herbst).
Calappa gallus (Herbst).

Bermuda, Hungry Bay (swamps).

Eurytium limosum (Say).

Goniopsis cruentatus (Latreille).

Bahia, shallow water (7 to 20 fathoms).

Leptopodia sagittaria (Fabricius).
Metoporaphis forficulatus, A. Milne Edwards.
Notolopas brasiliensis, n. sp.
Picroceroides tubularis, n. gen. and sp.
Macrocœloma trispinosa (Latreille).
Macrocœloma septemspinosa (Stimpson).
Macrocœloma concava, n. sp.
Mithrax cornutus, de Saussure.
Mithrax forceps, A. Milne Edwards.
Lambrus guérinii, F. de B. Capello.
Lambrus serratus, Milne Edwards.
Heterocrypta granulata (Gibbes).
Actæa rufopunctata, Milne Edwards, var. *nodosa*, Stimpson.
Micropanope spinipes, A. Milne Edwards.
Pilumnus brasiliensis, n. sp.
Pilumnus floridanus, Stimpson.
Pilumnus fragosus, A. Milne Edwards.
Cronius bispinosus, n. sp.
Ocypoda arenaria (Catesby).
Sesarma mülleri, A. Milne Edwards.
Persephona punctata (Browne).
Lithadia cariosa, Stimpson, var. *Iliacantha intermedia*, n. sp.

Stations 122–122c.—Off Barra Grande, 30 to 400 fathoms; lat. 9° 5′ 0″ to 9° 10′ 0″ S., long. 34° 49′ 0″ to 34° 53′ 0″ W.; bottom, red mud. Trawled.

Leptopodia sagittaria (Fabricius).
Metoporaphis forficulatus, A. Milne Edwards.
Podochela riisei (Stimpson).
Herbstia (*Herbstiella*) *depressa*, Stimpson.
Mithrax hispidus (Herbst), var. *pleuracanthus*, Stimpson.
Pilumnus floridanus, Stimpson.
Neptunus (*Hellenus*) *spinicarpus*, Stimpson.
Bathyplax typhlus, var. *oculiferus*, nov.

Fernando Noronha Island, shallow water (7 to 20 fathoms).

Apocremnus septemspinosus, A. Milne Edwards.
Picroceroides tubularis, n. gen. and sp.
Macrocœloma concava, n. sp.
Mithrax coronatus (Herbst).
Mithrax sp.
Mithrax (*Mithraculus*) *sculptus* (Lamarck).
Mithrax forceps, A. Milne Edwards.
Grapsus maculatus (Catesby).
Calappa gallus (Herbst).

St. Paul's Rocks, 10 to 80 fathoms (and shore ?).

Stenorhynchus (?) *spinifer*, n. sp. | *Grapsus maculatus* (Catesby)

Tristan da Cunha Group, Nightingale Island, 100 fathoms.

Pilumnoplax heterochir, Studer

Cape of Good Hope, Simon's Bay, shallow water (5 to 18 fathoms).

Stenorhynchus falcifer, Stimpson. | *Pericera cornuta*, Milne Edwards.
Achæopsis spinulosus, Stimpson. | *Plagusia chabrus* (Linné).
Dehaanius dentatus (Milne Edwards). | *Hymenosoma orbiculare* (Desmarest).
Calappa flammea (Herbst).

Mursia cristimana (Desmarest).

South Africa, Wellington and Cape Town (rivers).

Thelphusa (*Potamonautes*) *perlata*, Milne Edwards.

Sea Point.

Mursia cristimana (Desmarest).

STATION 142.—Agulhas Bank, 150 fathoms; December 18, 1873; lat. 35° 4′ 0″ S., long. 18° 37′ 0″ E.; bottom, green sand; bottom temperature, 47°·0. Dredged.

Lispognathus thomsoni (Norman). | *Litocheira kingsleyi*, n. sp.
Pilumnoplax heterochir, Studer. | *Mursia cristimana* (Desmarest).
Ebalia tuberculosa (A. Milne Edwards) (yg. ?).

INDO-PACIFIC OR ORIENTAL REGION.

STATION 161.—Port Philip, 33 fathoms; April 1, 1874; lat. 38° 22′ 30″ S., long. 144° 36′ 30″ E.; bottom, sand. Trawled.

Achæus tenuicollis, n. sp. | *Portunus corrugatus* (Pennant).
Pilumnus tomentosus, Latreille. | *Halicarcinus ovatus*, Stimpson.
Ebalia (*Phlyxia*) *intermedia*, n. sp.

STATION 162.—Bass Strait, East Moncœur Island, 38 fathoms; April 2, 1874; lat. 39° 10′ 30″ S., long. 146° 37′ 0″ E.; bottom, sand and shells. Dredged.

Achæus tenuicollis, n. sp.
Chlorinoides coppingeri, Haswell.
Micippa spinosa, var. *affinis*, Miers.
Actæa peronii (Milne Edwards).
Pilumnus tomentosus, Latreille.
Portunus corrugatus (Pennant).
Ebalia tuberculosa (A. Milne Edwards).
Ebalia (*Phlyxia*) *crassipes*, Bell.
Merocryptus lambriformis, A. Milne Edwards.

South Australian Coast, shallow water (2 to 10 fathoms), April 1874.

Oncinopus aranea, de Haan.
Gonatorhynchus tumidus, Haswell.
Micippa spinosa, Stimpson.
Actæa peronii (Milne Edwards).
Pilumnus rufopunctatus, Stimpson.
Neptunus (*Neptunus*) *sanguinolentus* (Herbst).
Thalamita sima, Milne Edwards.
Platyonychus bipustulatus, Milne Edwards.
Lissocarcinus polybioides, Adams and White.
Halicarcinus ovatus, Stimpson.
Calappa depressa, n. sp.
Leucosia australiensis, n. sp.
Philyra platycheira, de Haan.
Ebalia (*Phlyxia*) *crassipes*, Bell.
Ebalia (*Phlyxia*) *undecimspinosa* (Kinahan), var. *orbicularis*, Haswell.
Ebalia (*Phlyxia*) *dentifrons*, n. sp.

STATION 163A.—Off Twofold Bay, 150 fathoms; April 4, 1874; lat. 36° 59′ 0″ S., long. 150° 20′ 0″ E.; bottom, green mud. Dredged.

Medæus haswelli, n. sp.
Ebalia tuberculosa (A. Milne Edwards.
Merocryptus lambriformis, A. Milne Edwards.

New South Wales, Botany Bay (beach).

Mycteris platycheles, Milne Edwards.

New South Wales, Hawkesbury (brackish water).

Sesarma schüttei (Hess).

STATION 164B.—Off Sydney, 410 fathoms; June 13, 1874; lat. 34° 13′ 0″ S., long. 151° 38′ 0″ E.; bottom, green mud. Trawled.

Lispognathus thomsoni (Norman).

Sydney.

Pinnotheres villosulus, Guérin-Ménéville.

Port Jackson, shore, 3 to 15 fathoms.

Micippa spinosa, Stimpson.
Pilumnus vestitus, Haswell.
Pachygrapsus transversus, Gibbes.
Helice crassa, Dana.
Matuta lævidactyla, Miers.
Leucosia australiensis, n. sp.
Ebalia (*Phlyxia*) *crassipes*, Bell.
Ebalia (*Phlyxia*) *undecimspinosa* (Kinahan), var. *orbicularis*, Haswell.
Ebalia (*Phlyxia*) *quadridentata* (Gray), var. *spinifera*, nov.

Port Jackson, 30 to 35 fathoms.

Calappa lophos (Herbst).
Ebalia tuberculosa (A. Milne Edwards).
Ebalia (*Phlyxia*) *crassipes*, Bell.

STATION 167.—New Zealand, 150 fathoms; June 24, 1874; lat. 39° 32′ 0″ S., long. 171° 48′ 0″ E.; bottom, blue mud.

Ebalia lævis, Bell.
Ebalia tuberculosa (A. Milne Edwards).

STATION 167A.—New Zealand, Queen Charlotte Sound, near Long Island, 10 fathoms; June 27, 1874; lat. 41° 4′ 0″ S., long. 174° 19′ 0″ W.; bottom, mud. Dredged.

Hemiplax hirtipes (Heller).
Ommatocarcinus macgillivrayi, White.
Ebalia lævis (Bell).

STATION 172.—Tongatabu, off Nukalofa, 18 fathoms; July 22, 1874; lat. 20° 58′ 0″ S., long. 175° 9′ 0″ W.; bottom, coral mud. Dredged.

Menæthius monoceros, Latreille, var. *angusta*, Dana.
Lambrus (*Parthenolambrus*) *calappoides*, Adams and White.
Trapezia cymodoce (Herbst).
Pilumnus longicornis, Hilgendorf, var.
Xiphonectes longispinosus, Dana.
Thalamonyx danæ, var. *gracilipes*, nov.
Thalamita sima, Milne Edwards, var. *granulata*, nov.
Thalamita sexlobata, n. sp.
Thalamita stimpsoni, A. Milne Edwards.

STATION 172A.—Tongatabu, off Nukalofa, 240 fathoms; July 22, 1874; lat. 20° 56′ 0″ S., long. 175° 11′ 0″ W.; bottom, coral mud. Dredged.

Randallia granulata, n. sp.

Tongatabu, reefs.

Etisus lævimanus, Randall.
Thalamita admete (Herbst).
Thalamita prymna (Herbst).
Calappa hepatica (Linné).

Fiji Islands, Matuku.

Gelasimus annulipes, Milne Edwards.

Fiji Islands, Kandavu (reefs).

Zozymus æneus (Linné).
Trapezia guttata, Rüppell, var.
Trapezia areolata, var. *inermis*, A. Milne Edwards.
Cardiosoma carnifex (Herbst).
Euplax (*Chænostoma*) *boscii*, Audouin.
Gelasimus vocans, Linné.
Gelasimus annulipes, Milne Edwards.
Ocypoda ceratophthalma (Pallas).
Metopograpsus messor (Forskål).
Geograpsus grayi (Milne Edwards).
Pseudograpsus albus, Stimpson.
Helice latreillei, Milne Edwards.

Fiji Islands, Levuka (reefs).

Thalamita admete (Herbst).

STATION 173.—Fiji Islands, off Matuku, 315 fathoms; July 24, 1874; lat. 19° 9′ 35″ S., long. 179° 41′ 50″ E.; bottom, coral mud. Dredged.

Pilumnoplax abyssicola, n. sp.
Mursia curtispina, n. sp.
Randallia granulata, n. sp.

STATION 173A.—Fiji Islands, 310 fathoms; July 24, 1874; lat. 19° 9′ 32″ S., long. 179° 41′ 55″ E.; bottom, coral mud. Dredged.

Ethusa orientalis, n. sp.

New Hebrides, Api.

Epigrapsus politus, Heller.

Sesarma (*Holometopus*) *aubryi*, A. Milne Edwards.

Torres Strait (some 3 to 11 fathoms).

Chorilibinia gracilipes (Miers).
Schizophrys aspera (Milne Edwards).
Lambrus affinis, A. Milne Edwards.
Lambrus hoplonotus, var. *granulosus*, Miers.
Actæa granulata (Audouin).
Pilumnus pulcher, Miers.
Pilumnus seminudus, Miers.
Neptunus (*Amphitrite*) *rugosus*, A. Milne Edwards.
Macrophthalmus podophthalmus, Eydoux and Souleyet.
Ceratoplax ciliata, Stimpson.
Pinnotheres villosulus, Guérin Ménéville.
Myra affinis, Bell.

North Australia, Raine Island.

Ocypoda ceratophthalma (Pallas).

STATION 186.—Off Cape York, 8 fathoms; September 8, 1874; lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E.; bottom, coral mud. Dredged.

Huenia proteus, de Haan.
Menæthius monoceros, Latreille, var. *angusta* (Dana).
Pseudomicippa varians, Miers.
Lambrus (*Aulacolambrus*) *hoplonotus*, Adams and White.
Actæa hirsutissima, Rüppell.
Actæa hystrix, n. sp.
Pilumnus pulcher, Miers.
Pilumnus labyrinthicus, Miers.
Neptunus (*Achelous*) *unispinosus* (Miers).
Thalamita sima, Milne Edwards.
Thalamita intermedia, n. sp.

STATION 187.—Torres Strait, 6 fathoms; September 9, 1874; lat. 10° 36′ 0″ S., long. 141° 55′ 0″ E.; bottom, coral mud. Dredged.

Lambrus intermedius, Miers.
Matuta inermis, Miers.
Myra australis, Haswell.

Albany Island.

Thalamita crenata, Rüppell.
Mycteris longicarpus (Latreille).

STATION 188.—South of New Guinea, 28 fathoms; September 10, 1874; lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E.; bottom, green mud. Dredged and trawled.

Egeria arachnoides (Rumph).
Chorilibinia gracilipes (Miers).
Hyastenus planasius (Adams and White).
Hyastenus (*Chorilia*) *oryx*, A. Milne Edwards.
Lambrus longimanus (Linné).
Lambrus hoplonotus, var. *longioculis*, Miers.
Cryptopodia fornicata (Fabricius).
Atergatopsis granulatus, A. Milne Edwards.
Neptunus (*Amphitrite*) *hastatoides*, (Fabricius).
Neptunus (*Amphitrite*) *gladiator*, (Fabricius).
Neptunus (*Achelous*) *whitei*, A. Milne Edwards.
Ceratoplax arcuata, Miers.
Notonyx nitidus, A. Milne Edwards.
Leucosia haswelli, n. sp.
Leucosia ocellata, Bell.
Leucosia whitei, Bell.
Leucosia craniolaris (Linné).
Myra fugax (Fabricius).
Ebalia lambriformis, Bell.
Myrodes eudactylus, Bell.

Arafura Sea.

Oncinopus aranea, de Haan.
Huenia proteus, de Haan.
Macrophthalmus podophthalmus, Eydoux and Souleyet (yg. ?).

STATION 190.—Arafura Sea, 49 fathoms; September 12, 1874; lat. 8° 56′ 0″ S., long. 136° 5′ 0″ E.; bottom, green mud. Trawled.

Egeria arachnoides (Rumph.).
Hyastenus diacanthus (de Haan).
Goniosoma ornatum, A. Milne Edwards.
Leucosia craniolaris (Linné).
Myra fugax (Fabricius).

STATION 191.—Banda Sea, 800 fathoms; September 23, 1874; lat. 5° 41′ 0″ S., long. 134° 4′ 30″ E.; bottom, green mud; bottom temperature, 39°·5. Trawled.

Ethusa (*Ethusina*) *gracilipes*, var. *robusta*, nov.

STATION 192.—Ki Islands, 140 fathoms; September 26, 1874; lat. 5° 49′ 15″ S., long. 132° 14′ 15″ E.; bottom, blue mud. Trawled.

Cyrtomaia murrayi, n. gen. and sp.
Oxypleurodon stimpsoni, n. gen. and sp.
Pugettia velutina, n. sp.
Hyastenus elegans, n. sp.
Pilumnus normani, n. sp.
Lupocyclus (*Parathranites*) *orientalis*, n. subgen. and sp.
Platyonychus iridescens, n. sp.

Moluccas, Amboina, 100 fathoms.

Naxia hystrix, n. sp. | *Lambrus longimanus* (Linné).

Amboina, 10 to 25 fathoms.

Lambrus turriger, White. | *Calappa hepatica* (Linné).
Gonoplax sinuatifrons, n. sp. | *Calappa gallus* (Herbst).

STATION 195.—Banda Sea, 1425 fathoms; October 3, 1874; lat. 4° 21′ 0″ S., long. 129° 7′ 0″ E.; bottom, blue mud; bottom temperature, 38°. Trawled.

Ethusa (*Ethusina*) *gracilipes*, var. *robusta*, nov.

Banda (fresh water).

Varuna litterata (Fabricius).

STATION 196.—Moluccas Passage, 825 fathoms; October 13, 1874; lat. 0° 48′ 30″ S., long. 126° 58′ 30″ E.; bottom, hard ground; bottom temperature, 36°·9. Trawled.

Oncinopus aranea, de Haan.

Ternate.

Atergatis floridus (Linné). | *Thalamita prymna* (Herbst).
Neptunus (*Neptunus*) *sanguinolentus* (Herbst). | *Matuta victrix* (Fabricius), var. *crebrépunctata*, Miers.

Banda (fresh water).

Varuna litterata (Fabricius).

Arrou (Aröe) Islands.

Ceratocarcinus longimanus, Adams and White. | *Ocypoda ceratophthalma* (Pallas) (yg.).
Neptunus (*Amphitrite*) *tuberculosus*, A. Milne Edwards. | *Grapsus strigosus* (Herbst).
Gelasimus vocans (Linné). | *Sesarma* (*Holometopus*) *aubryi*, A. Milne Edwards.
Gelasimus tetragonon (Herbst).

Hong Kong, 7 to 10 fathoms.

Neptunus (*Amphitrite*) *hastatoides* (Fabricius). | *Leucosia craniolaris* (Linné).
Goniosoma cruciferum (Fabricius). | *Arcania septemspinosa* (Fabricius).
Dorippe facchino (Herbst).

STATION 203.—Philippine Islands, near Masbate, 20 fathoms; October 31, 1874; lat. 11° 6′ 0″ N., long. 123° 9′ 0″ E.; bottom, mud. Trawled.

Neptunus (*Neptunus*) *pelagicus* (Linné).

Manila, 1 fathom.

Ixa cylindrus (Fabricius), var. *megaspis*, Adams and White.

STATION 207.—Philippine Islands, 700 fathoms; January 16, 1875; lat. 12° 21′ 0″ N., long. 122° 15′ 0″ E.; bottom, blue mud; bottom temperature, 51°·6. Trawled.

Ethusa (*Ethusina*) *gracilipes*, n. sp.

STATION 208.—Philippine Islands, 18 fathoms; January 17, 1875; lat. 11° 37′ 0″ N., long. 123° 31′ 0″ E.; bottom, blue mud. Trawled.

Hyastenus diacanthus (de Haan).
Hyastenus oryx, A. Milne Edwards.
Pilumnus dehaani, Miers.
Neptunus (*Amphitrite*) *rugosus*, A. Milne Edwards.
Neptunus (*Amphitrite*) *spinipes*, n. sp.

Samboangan, 10 to 20 fathoms, and beach.

Naxia hirta, A. Milne Edwards.
Lambrus contrarius (Herbst).
Xantho bidentatus, A. Milne Edwards.
Carpilodes bellus (Dana).
Actæodes tomentosus (Milne Edwards).
Leptodius exaratus, var. *sanguineus* (Milne Edwards).
Phymodius monticulosus (Dana).
Pilumnus scabriusculus, Adams and White.
Trapezia cymodoce (Herbst).
Trapezia rufopunctata (Herbst).
Neptunus (*Achelous*) *granulatus* (Milne Edwards).
Thalamita prymna (Herbst).
Thalamita stimpsonii, A. Milne Edwards.
Gelasimus rubripes, Jacquinot and Lucas.
Gelasimus annulipes, Milne Edwards.
Ocypoda ceratophthalma (Pallas), (yg. ?)
Helice latreillei, Milne Edwards.
Matuta victrix (Fabricius).
Matuta banksii, Leach.

Philippine Islands, Zebu (reefs).

Atergatis floridus (Linné).

Philippine Islands, Mindanao, Pasananca (rivers).

Thelphusa sinuatifrons, Milne Edwards.

Varuna litterata, Fabricius.

STATION 210.—Philippine Islands, 375 fathoms; January 25, 1875; lat. 9° 26′ 0″ N., long. 123° 45′ 0″ E.; bottom, blue mud; bottom temperatnre, 54°·1. Trawled and dredged.

Anamathia pulchra, n. sp.

Echinoplax moseleyi, n. gen. and sp.

Oxypleurodon stimpsoni, n. gen. and sp.

STATION 212.—Celebes Sea, 10 fathoms; January 30, 1875; lat. 6° 54′ 0″ N., long. 122° 18′ 0″ E.; bottom, sand. Trawled and dredged.

Egeria arachnoides (Rumph).

Neptunus (*Amphitrite*) *rugosus*, A. Milne Edwards.

Neptunus (*Amphitrite*) *gladiator* (Fabricius), var. *argentatus*, White.

Lissocarcinus lævis, n. sp.

Leucosia haswelli, n. sp.

Myra darnleyensis, Haswell.

Cymopolia jukesii, White.

Gomeza bicornis, Gray (10 to 20 fathoms).

STATION 214.—Tulur Islands, 500 fathoms; February 10, 1875; lat. 4° 33′ 0″ N., long. 127° 6′ 0″ E.; bottom, blue mud; bottom temperature, 41°·8. Dredged.

Cyrtomaia suhmi, n. sp.

Off North Coast of New Guinea (drift wood).

Varuna litterata (Fabricius).

Plagusia immaculata, Lamarck.

Admiralty Islands, Nares Harbour.

Cardiosoma carnifex (Herbst).

STATION 219.—North of the Admiralty Islands, 150 fathoms; March 10, 1875; lat. 1° 54′ 0″ S., long. 146° 39′ 40″ E.; bottom, coral mud. Trawled.

Platymaia wyville-thomsoni, n. gen. and sp.

Ergasticus naresii, n. sp.

Lupocyclus (*Parathranites*) *orientalis*, n. subgen. and sp.

Paracycloïs milne-edwardsi, n. gen. and sp.

Admiralty Islands, 16 to 25 fathoms.

Neptunus (*Achelous*) *granulatus* (Milne Edwards).

Admiralty Islands, Wild Island (beach).

Sesarma (*Holometopus*) *aubryi*, A. Milne Edwards.

STATION 232.—Japan, off Inosima, 345 fathoms; May 12, 1875; lat. 35° 11′ 0″ N., long. 139° 28′ 0″ E.; bottom, green mud; bottom temperature, 41°·1. Trawled and dredged.

Macrocheira kämpferi, de Haan.

Japan, off Yokoska, 10 fathoms.

Pugettia incisa (de Haan).

Pilumnoplax vestita (de Haan), var. *sexdentata*, Haswell.

Japan, Kobé (some 8 to 10 fathoms).

Thelphusa (*Geothelphusa*) *dehaanii*, White.

Macrophthalmus serratus, Adams and White.

Arcania septemspinosa (Fabricius).

STATION 233A.—Japan, near Kobé, 50 fathoms; May 19, 1875; lat. 34° 38′ 0″ N., long. 135° 1′ 0″ E.; bottom, sand. Dredged.

Achæus japonicus, de Haan.
Scyra compressipes, Stimpson.
Lophozozymus (*Lophoxanthus*) *bellus*, Stimpson, var. *leucomanus*, Lockington.
Sphærozius nitidus, Stimpson.
Pilumnus minutus, var. *hirsutus*, Stimpson.
Pilumnus globosus, Dana.
Neptunus (*Amphitrite*) *hastatoides*, (Fabricius).
Goniosoma variegatum (Fabricius) var. *bimaculatum*, nov.
Platygrapsus depressus, de Haan.
Leucosia craniolaris (Linné).
Dorippe japonica, v. Siebold (8 to 50 fathoms).

Japan, Oosima (pools).

Brachynotus (*Heterograpsus*) *penicillatus* (de Haan).

STATION 233B.—Japan, 15 fathoms; May 26, 1875; lat. 34° 18′ 0″ N., long. 133° 35′ 0″ E.; bottom, blue mud. Trawled.

Neptunus (*Amphitrite*) *hastatoides*, (Fabricius.)

Pilumnoplax vestita (de Haan), var. *sexdentata*, Haswell.

Arcania septemspinosa (Fabricius).

Japan, near Lake Biva.

Thelphusa (*Geothelphusa*) *dehaanii*, White.

Japan, Hakouni (2500 feet).

Thelphusa (*Geothelphusa*) *dehaanii*, White.

STATION 237.—Japan, near Yokohama, 1875 fathoms; June 17, 1875; lat. 34° 37′ 0″ N., long. 140° 32′ 0″ E.; bottom, blue mud; bottom temperature, 35°·3. Trawled.

Ethusa (*Ethusina*) *challengeri*, n. sp.

Sandwich Islands, Hawaii.

Neptunus (*Neptunus*) *sanguinolentus* (Herbst).

Sandwich Islands, Hilo (beach).

Metopograpsus messor (Forskål).

Sandwich Islands, Honolulu (reefs), some 16, 18 to 20 fathoms.

Carpilius maculatus (Linné).
Lophactæa granulosa (Rüppell).
Actæa nodulosa, White.
Etisus lævimanus, Randall.
Trapezia rufopunctata, var. *guttata*, Rüppell.
Neptunus (*Neptunus*) *sanguinolentus* (Herbst).
Thalamita integra, Dana.
Podophthalmus vigil (Fabricius).
Calappa hepatica (Linné).

Society Islands, Tahiti, Papiete.

Scylla serrata (Forskål).
Cardiosoma carnifex (Herbst).
Gelasimus tetragonon (Herbst).
Metopograpsus messor (Forskål).

Chili, Valparaiso (shore).

Cancer longipes, Bell.
Acanthocyclus gayi, Milne Edwards and Lucas.
Leptograpsus variegatus (Fabricius).

Messier Channel (fresh water).

Acanthocyclus gayi, Milne Edwards and Lucas.

ANTARCTIC OR AUSTRAL CIRCUMPOLAR REGION.

STATION 304.—Chiloe, off Cape Tres Montes, 45 fathoms; December 31, 1875; lat. 46° 53′ 15″ S., long. 75° 12′ 0″ W.; bottom, green sand. Dredged.

Eurypodius latreillei, Guérin-Ménéville.
Libinia gracilipes, n. sp.
Hypopeltarium spinulosum, White.

STATION 308.—Chiloe, 175 fathoms; January 5, 1876; lat. 50° 8′ 30″ S., long. 74° 41′ 0″ W.; bottom, blue mud. Trawled.

Eurypodius longirostris, n. sp.

STATION 311.—Coast of Chiloe, 245 fathoms; January 11, 1876; lat. 52° 45′ 30″ S., long. 73° 46′ 0″ W.; bottom, blue mud; bottom temperature, 46°. Trawled.

Libinia smithii, n. sp.

Magellan Strait, Port William.

Eurypodius latreillei, Guérin-Ménéville.

STATION 312.—Magellan Strait, Port Famine, 9 fathoms; January 13, 1876; lat. 53° 37′ 30″ S., long. 70° 56′ 0″ W.; bottom, blue mud. Dredged.

Eurypodius latreillei, Guérin-Ménéville.

STATIONS 313, 314.—Magellan Strait, 55 and 70 fathoms; January 20, 21, 1876; lat. 52° 20′ 0″ S. to 51° 35′ 0″ S., long. 67° 39′ 0″ W. to 65° 39′ 0″ W.; bottom, sand. Trawled.

Eurypodius latreillei, Guérin-Ménéville.

STATIONS 315, 316.—Falkland Islands,' 12 and 4 fathoms; January 26 and February 3, 1876; lat. 51° 40′ 0″ S. to 51° 32′ 0″ S., long. 57° 50′ 0″ W. to 58° 6′ 0″ W.; bottom, sand, gravel (Station 315), and mud (Station 316). Dredged.

Eurypodius latreillei, Guérin-Méneville.

Hypopeltarium spinulosum, White.

Halicarcinus planatus (Fabricius).

Port Stanley.

Hypopeltarium spinulosum, White.

Port William.

Halicarcinus planatus (Fabricius).

Near Marion Island, 50 to 75 fathoms.

Halicarcinus planatus (Fabricius).

Off Prince Edward Island, 85 to 150 fathoms.

Halicarcinus planatus (Fabricius).

Off Kerguelen Island (rock pools).

Halicarcinus planatus (Fabricius).

New Zealand, South Island, Cape Campbell.

Halicarcinus planatus (Fabricius).

BATHYMETRICAL DISTRIBUTION.[1]

The greater number of the species collected by the Expedition are littoral or shallow-water forms; and this observation applies especially to the families Cancridæ in the Cyclometopa, and Grapsidæ in the Catometopa; in these groups, also, the new species obtained are comparatively few and unimportant. About 280 species and well-marked varieties are in the collection; of these, between 180 and 190 were taken on the shore, or in 1 to 20 fathoms, and perhaps between 70 to 80 in 20 to 100 fathoms; of which, however, not a few (as, *e.g.*, the Brazilian species, dredged between 30 to 350 fathoms in Station 122) may have been taken at greater depths. The new forms obtained, as I have already noted in the abstract of my Report, published in the introductory volume (pt. ii.) of the Challenger Reports, are chiefly in the groups Oxyrhyncha and Oxystomata, and were dredged at depths greater than 200 fathoms; thus of the littoral and shallow-water species and varieties, scarcely 20 are new to science, and of those obtained in 20 to 100 fathoms, scarcely 15; of 21 species obtained in 200 to 500 fathoms, about half are undescribed forms; between 500 to 1000 fathoms, but 3 species (2 previously described) were obtained; and but two species, *Ethusa* (*Ethusina*) *challengeri*, n. sp., dredged in 1875 fathoms, and *Ethusa* (*Ethusina*) *gracilipes*, nov., var. *robusta*, nov., taken in 1425 fathoms, occurred beyond this depth.

Shore and 1 to 20 fathoms.

(Littoral and shallow-water species).

Leptopodia sagittaria (Fabricius).
Metoporaphis forficulatus, A. Milne Edwards.
Stenorhynchus falcifer, Stimpson.
? *Stenorhynchus spinifer*, n. sp.
Podochela riisei, Stimpson.
? *Apocremnus septemspinosus*, A. Milne Edwards.
Achæopsis spinulosus, Stimpson.
Oncinopus aranea, de Haan.
Eurypodius latreillei, Guérin-Ménéville.
Gonatorhynchus tumidus, Haswell.
Huenia proteus, de Haan.
Menæthius monoceros (Latreille), var. *angusta*, Dana.
Dehaanius dentatus (Milne Edwards).

[1] The note of interrogation prefixed to a species denotes that the depth at which it was taken was not exactly noted.

Pugettia incisa (de Haan).
Acanthonyx lunulatus, Risso.
Egeria arachnoides, Rumph.
Chorilibinia gracilipes, Miers.
Herbstia rubra, A. Milne Edwards.
Herbstia violacea (A. Milne Edwards).
Herbstia ovata, Stimpson.
Hyastenus diacanthus (de Haan).
Hyastenus oryx, A. Milne Edwards.
Naxia hirta, A. Milne Edwards.
Notolopas brasiliensis, n. sp.
Schizophrys aspera, Milne Edwards.
Pseudomicippa varians, Miers.
Micippa spinosa, Stimpson.
Pericera cornuta, Milne Edwards.
Picroceroides tubularis, n. gen. and sp.
Macrocœloma trispinosa, Latreille.
Macrocœloma septemspinosa (Stimpson).
Macrocœloma concava, n. sp.
Microphrys bicornutus (Latreille).
Mithrax (*Nemausa*) *rostrata*, A. Milne Edwards.
Mithrax cornutus, de Saussure.
Mithrax forceps, A. Milne Edwards.
Mithrax coronatus (Herbst).
Lambrus contrarius (Herbst).
Lambrus affinis, A. Milne Edwards.
Lambrus intermedius, Miers.
? *Lambrus turriger*, White.
Lambrus guérini, F. de B. Capello.
Lambrus serratus (Milne Edwards).
Lambrus (*Aulacolambrus*) *hoplonotus*, Adams and White, var. *granulosus*, Miers.
Lambrus (*Parthenolambrus*) *massena*, Roux, with var. *atlanticus*, Miers.
Lambrus (*Parthenolambrus*) *calappoides*, Adams and White.
Heterocrypta granulata, Gibbes.
Ceratocarcinus longimanus, Adams and White.
Cancer longipes, Bell.
Carpilius maculatus (Linné).
Atergatis floridus (Linné).
Lophactæa lobata (Milne Edwards).
Lophactæa granulosa, Rüppell.
Actæa granulata, Audouin.
Actæa hirsutissima (Rüppell).
Actæa nodulosa, White.
Actæa hystrix, n. sp.
Actæa peronii, Milne Edwards.
Actæa rufopunctata, Milne Edwards, var. *nodosa*, Stimpson.
Xantho bidentatus, A. Milne Edwards.
Xanthodes melanodactylus, A. Milne Edwards.
Panopeus herbstii, var. *serratus* (Saussure).
Micropanope spinipes, A. Milne Edwards.
Etisus lævimanus, Randall.
Carpilodes bellus (Dana).
Zozymus æneus, Linné.
Actæodes tomentosus, Milne Edwards.
Leptodius exaratus, var. *sanguineus*, Milne Edwards.
Leptodius punctatus, Miers.
Phymodius monticulosus, Dana.
Eurytium limosum, Say.
Pseudozius bouvieri, A. Milne Edwards, var. *mellissii*, Miers.
Pilumnus africanus, A. Milne Edwards.
Pilumnus brasiliensis, n. sp.
Pilumnus fragosus, A. Milne Edwards.
Pilumnus dehaani, Miers.
Pilumnus scabriusculus, Adams and White.
Pilumnus longicornis, Hilgendorf, var.
Pilumnus vestitus, Haswell.

Pilumnus rufopunctatus, Stimpson.
Pilumnus pulcher, Miers.
Pilumnus seminudus, Miers.
Pilumnus labyrinthicus, Miers.
Eriphia gonagra, Fabricius.
Trapezia cymodoce (Herbst).
Trapezia guttata, Rüppell, var.
Trapezia areolata, var. *inermis*, A. Milne Edwards.
Trapezia rufopunctata (Herbst), with var. *intermedia*, nov.
Neptunus pelagicus (Linné).
Neptunus sanguinolentus (Herbst).
Neptunus (*Amphitrite*) *hastatoides* (Fabricius).
Neptunus (*Amphitrite*) *tuberculosus*, A. Milne Edwards.
Neptunus (*Amphitrite*) *rugosus*, A. Milne Edwards.
Neptunus (*Amphitrite*) *gladiator* (Fabricius), var. *argentatus*, White.
Neptunus (*Amphitrite*) *spinipes*, n. sp.
Neptunus (*Achelous*) *granulatus*, Milne Edwards.
Neptunus (*Achelous*) *unispinosus*, Miers.
Neptunus (*Achelous*) *depressifrons* (Stimpson).
Xiphonectes longispinosus, Dana.
Scylla serrata, Forskål.
Cronius bispinosus, n. sp.
Goniosoma cruciferum (Fabricius).
Thalamonyx danæ, var. *gracilipes*, A. Milne Edwards.
Thalamita admete (Herbst).
Thalamita integra, Dana.
Thalamita sima, Milne Edwards.
Thalamita intermedia, n. sp.
Thalamita sexlobata, n. sp.
Thalamita prymna (Herbst).
Thalamita stimpsoni, A. Milne Edwards.
Thalamita crenata, Rüppell.
Portunus corrugatus (Pennant).
Platyonychus bipustulatus, Milne Edwards.
Lissocarcinus polybioides, Adams and White.
Lissocarcinus lævis, n. sp.
Podophthalmus vigil, Fabricius.
Acanthocyclus gayi, Milne Edwards and Lucas.
Hypopeltarium spinulosum, White.
Gomeza bicornis, Gray.
Pilumnoplax vestita, de Haan, var. *sexdentata*, Haswell.
Ceratoplax ciliata, Stimpson.
Ocypoda ceratophthalma, Pallas.
Ocypoda cursor (Linné).
Ocypoda arenaria (Catesby).
Gelasimus vocans (Linné).
Gelasimus rubripes, Jacquinot and Lucas.
Gelasimus tetragonon (Herbst).
Gelasimus annulipes, Milne Edwards.
Gonoplax sinuatifrons, n. sp.
Ommatocarcinus macgillivrayi, White.
Macrophthalmus podophthalmus, Eydoux and Souleyet.
Macrophthalmus serratus, Adams and White.
Hemiplax hirtipes (Heller).
Euplax (*Chænostoma*) *boscii* (Audouin).
Grapsus maculatus (Catesby).
Grapsus strigosus (Herbst).
Leptograpsus variegatus (Fabricius).
Metopograpsus messor (Forskål).
Pachygrapsus transversus, Gibbes.
Geograpsus grayi (Milne Edwards).
Pseudograpsus albus, Stimpson.
Brachynotus (*Heterograpsus*) *penicillatus*, de Haan.

Varuna litterata (Fabricius).
Epigrapsus politus, Heller.
Goniopsis cruentatus, Latreille.
Helice latreillei, Milne Edwards, var.
Helice crassa, Dana.
Sesarma müllerii, A. Milne Edwards.
Sesarma schüttei, Hess.
Sesarma (*Holometopus*) *aubryi*, A. Milne Edwards.
Plagusia depressa (Fabricius).
Plagusia immaculata, Lamarck.
Plagusia chabrus (Linné).
Pinnotheres villosulus, Guérin-Ménéville.
Mycteris longicarpus (Latreille).
Mycteris platycheles, Milne Edwards.
Hymenosoma orbiculare (Desmarest).
Halicarcinus planatus (Fabricius).
Halicarcinus ovatus, Stimpson.
Calappa flammea (Herbst).
Calappa hepatica (Linné).
Calappa gallus (Herbst).
Calappa depressa, n. sp.
Mursia cristimana (Desmarest).
Cryptosoma cristatum, Leach (*ined.*), Brullé.
Matuta victrix (Fabricius), with var. *crebrépunctata*, Miers.
Matuta banskii, Leach.
Matuta lævidactyla, Miers.
Matuta inermis, Miers.
Arcania septemspinosa (Fabricius).
Ixa cylindrus, Fabricius, var. *megaspis*, Adams and White.
Iliacantha intermedia, n. sp.
Ebalia lævis, Bell.
Ebalia (*Phlyxia*) *crassipes*, Bell.
Ebalia (*Phlyxia*) *undecimspinosa* (Kinahan), var. *orbicularis*, Haswell.
Ebalia (*Phlyxia*) *quadridentata*, Gray, var. *spinifera*, nov.
Ebalia (*Phlyxia*) *dentifrons*, n. sp.
Persephona punctata (Browne).
Myra australis, Haswell.
Myra affinis, Bell.
Myra darnleyensis, Haswell.
Lithadia cariosa, Stimpson, var.
Philyra platycheira, de Haan.
? *Leucosia australiensis*, n. sp.
Leucosia haswelli, n. sp.
Leucosia craniolaris (Linné).
Dorippe facchino (Herbst).
Cymopolia caronii, Roux.
Cymopolia jukesii, White.

20 to 100 fathoms.

Leptopodia sagittaria, Fabricius.
Metoporaphis forficulatus, A. Milne Edwards.
Stenorhynchus spinifer, n. sp.
Achæus japonicus, de Haan.
Achæus tenuicollis, n. sp.
? *Podochela riisei*, Stimpson.
Inachus leptochirus, Leach.
Eurypodius latreillei, Guérin-Ménéville.
Egeria arachnoides (Rumph).
Chorilibinia gracilipes, Miers.
Hyas aranea (Linné).
Hyas coarctata, Leach.
? *Herbstia* (*Herbstiella*) *depressa*, Stimpson.
Chlorinoides coppingeri, Haswell.
Pisa (*Arctopsis*) *tribulus* (Linné).
Hyastenus diacanthus, de Haan.
Hyastenus planasius, Adams and White.

Scyra compressipes, Stimpson.
Micippa spinosa, var. *affinis*, Miers.
Libinia gracilipes, n. sp.
? *Mithrax hispidus* (Herbst), var. *pleuracanthus*, Stimpson (?).
Lambrus longimanus (Linné).
? *Lambrus turriger*, White.
Lambrus (*Aulacolambrus*) *hoplonotus*, var. *longioculis*, Miers.
Lambrus (*Parthenolambrus*) *massena*, Roux.
Lambrus (*Parthenolambrus*) *expansus*, Miers.
Cryptopodia fornicata (Fabricius).
Heterocrypta maltzani, Miers.
Lophozozymus (*Lophoxanthus*) *bellus*, Stimpson, var. *leucomanus*, Lockington.
Actæa peronii (Milne Edwards).
Atergatopsis granulatus, Stimpson.
Xanthodes melanodactylus, A. Milne Edwards.
Sphærozius nitidus, Stimpson.
Pilumnus spinifer, Milne Edwards.
? *Pilumnus floridanus*, Stimpson.
Pilumnus minutus, de Haan, var. *hirsutus*, nov.
Pilumnus globosus, Dana.
Pilumnus tomentosus, Latreille.
Neptunus sayi, A. Milne Edwards.
Neptunus (*Amphitrite*) *hastatus* (Linné).
Neptunus (*Amphitrite*) *hastatoides* (Fabricius).
Neptunus (*Amphitrite*) *gladiator* (Fabricius).
Neptunus (*Achelous*) *whitei*, A. Milne Edwards.
? *Neptunus* (*Achelous*) *granulatus*, Milne Edwards.
Goniosoma variegatum, Fabricius, var. *bimaculatum*, nov.
Goniosoma ornatum, A. Milne Edwards.
Portunus corrugatus, Pennant.
Hypopeltarium spinulosum, White.
? *Bathyplax typhlus*, Milne Edwards, var. *oculiferus*, nov.
Ceratoplax arcuata, Miers.
Notonyx nitidus, A. Milne Edwards.
? *Gonoplax sinuatifrons*, n. sp.
Platygrapsus depressus (de Haan).
Halicarcinus planatus (Fabricius)
Halicarcinus ovatus, Stimpson.
Calappa granulata (Linné).
Calappa lophos (Herbst).
? *Calappa gallus* (Herbst).
? *Myrodes eudactylus*, Bell.
Ebalia lambriformis (Bell).
Ebalia tuberculosa, A. Milne Edwards.
Ebalia (*Phlyxia*) *crassipes*, Bell.
Ebalia (*Phlyxia*) *intermedia*, n. sp.
Myra fugax (Fabricius).
Merocryptus lambriformis, A. Milne Edwards.
Leucosia haswelli, n. sp.
Leucosia ocellata (Bell).
Leucosia whitei, Bell.
Leucosia craniolaris (Linné).
Dorippe japonica, v. Siebold.

100 to 200 fathoms.

Leptopodia sagittaria (Fabricius) (?).
Metoporaphis forficulatus, A. Milne Edwards.
Podochela riisei, Stimpson.
Platymaia wyville-thomsoni, n. gen. and sp.
Cyrtomaia murrayi, n. gen. and sp.
Eurypodius longirostris, n. sp.
Lispognathus thomsoni, Norman.
Ergasticus naresii, n. sp.
Oxypleurodon stimpsoni, n. gen. and sp.
Pugettia velutina, n. sp.
Herbstia (*Herbstiella*) *depressa*, Stimpson (?).
Hyastenus elegans, n. sp.
Naxia hystrix, n. sp.
Mithrax hispidus (Herbst), var. *pleuracanthus*, Stimpson (?).
Medæus haswelli, n. sp.
Pilumnus floridanus, Stimpson (?).
Pilumnus normani, n. sp.
Lupocyclus (*Parathranites*) *orientalis*, n. subgen. and sp.
Platyonychus iridescens, n. sp.
Pilumnoplax heterochir, Studer.
Bathyplax typhlus, A. Milne Edwards, var. *oculiferus*, nov (?).
Litocheira kingsleyi, n. sp.
Halicarcinus planatus (Fabricius).
Paracycloïs milne-edwardsii, n. gen. and sp.
Mursia cristimana, Desmarest.
Ebalia lævis, Bell.
Ebalia tuberculosa (A. Milne Edwards).
Merocryptus lambriformis, A. Milne Edwards.

200 to 500 fathoms.

Leptopodia sagittaria, Fabricius (?).
Metoporaphis forficulatus, A. Milne Edwards (?).
Podochela riisei, Stimpson.
Cyrtomaia suhmii, n. sp.
Anamathia pulchra, n. sp.
Lispognathus thomsoni (Norman).
Echinoplax moseleyi, n. gen. and sp.
Macrocheira kämpferi, de Haan.
Oxypleurodon stimpsoni, n. gen. and sp.
Herbstia (*Herbstiella*) *depressa*, Stimpson (?).
Libinia smithii, n. sp.
Mithrax hispidus (Herbst), var. *pleuracanthus*, Stimpson (?).
Heterocrypta maltzani, Miers.
Pilumnus floridanus, Stimpson (?).
Neptunus (*Hellenus*) *spinicarpus* (Stimpson).
Geryon (?) *incertus*, n. sp.
Pilumnoplax abyssicola, n. sp.
Bathyplax typhlus, A. Milne Edwards, var. *oculiferus*, nov. (?).
Mursia curtispina, n. sp.
Randallia granulata, n. sp.
Ethusa orientalis, n. sp.

500 to 1000 fathoms.

Oncinopus aranea, de Haan.
Ethusa microphthalma, Smith.
Ethusa gracilipes, n. sp.; with var. *robusta*, nov.

1000 to 2000 fathoms.

Ethusa (*Ethusina*) *challengeri*, n. sp.
Ethusa (*Ethusina*) *gracilipes*, n. sp., var. *robusta*, nov.

Gulf-weed and Pelagic Species.

Neptunus sayi, A. Milne Edwards.
Nautilograpsus minutus (Linné).

Land and Fresh-water Species.

Acanthocyclus gayi, Milne Edwards and Lucas.
Thelphusa sinuatifrons, Milne Edwards.
Thelphusa (*Potamonautes*) *perlata*, Milne Edwards.
Thelphusa (*Geothelphusa*) *dehaanii*, White.
Geocarcinus lagostoma (Milne Edwards).
Cardiosoma guanhumi, Latreille.
Cardiosoma armatum, Herklots.
Cardiosoma carnifex, Herbst.
Varuna litterata (Fabricius).

SYNOPTIC LIST OF THE SPECIES.

BRACHYURA.

OXYRHYNCHA or MAIOIDEA.

INACHIDÆ.

Leptopodia sagittaria (Fabricius), p. 4.
Metoporaphis forficulatus, A. Milne Edwards, p. 5.
Stenorhynchus falcifer, Stimpson, p. 6, Pl. I. fig. 1.
Stenorhynchus (?) *spinifer*, n. sp., p. 7, Pl. I. fig. 2.
Achæus japonicus, de Haan, p. 9.
Achæus tenuicollis, n. sp., p. 9, Pl. I. fig. 3.
Podochela riisei (Stimpson), p. 11.
Platymaia wyville-thomsoni, n. gen. and sp., p. 13, Pl. II. fig. 1.
Cyrtomaia murrayi, n. gen. and sp., p. 15, Pl. III. fig. 1.
Cyrtomaia suhmii, n. sp., p. 16, Pl. III. fig. 2.
Apocremnus septemspinosus, A. Milne Edwards, p. 17.
Achæopsis spinulosus, Stimpson, p. 18, Pl. I. fig. 4.
Inachus leptochirus, Leach, p. 20.
Oncinopus aranea, de Haan, p. 20.
Eurypodius latreillei, Guérin-Ménéville, p. 22, Pl. IV. fig. 3.
Eurypodius longirostris, n. sp., p. 23, Pl. V. fig. 1.
Gonatorhynchus tumidus, Haswell, p. 25.
Anamathia pulchra, n. sp., p. 26, Pl. IV. fig. 1.
Lispognathus thomsoni (Norman), p. 28, Pl. V. fig. 2.
Ergasticus naresii, n. sp., p. 30, Pl. V. fig. 3.
Echinoplax moseleyi, n. gen. and sp., p. 32, Pl. IV. fig. 2.
Macrocheira kämpferi, de Haan, p. 33.
Huenia proteus, de Haan, p. 35.
Menæthius monoceros (Latreille), var. *angusta*, Dana, p. 37.
Oxypleurodon stimpsoni, n. gen. and sp., p. 38, Pl. VI. fig. 1.
Dehaanius dentatus (Milne Edwards), p. 39.
Pugettia incisa (de Haan), p. 40.
Pugettia velutina, n. sp., p. 41, Pl. VI. fig. 2.
Acanthonyx lunulatus (Risso), p. 43.

Maiidæ.

Egeria arachnoides (Rumph), p. 44.
Chorilibinia gracilipes, Miers, p. 46.
Hyas aranea (Linné), p. 47.
Hyas coarctata, Leach, p. 48.
Herbstia rubra, A. Milne Edwards, p. 49, Pl. VII. fig. 1.
Herbstia violacea (A. Milne Edwards), p. 50.
Herbstia ovata (Stimpson), p. 50.
Herbstia (*Herbstiella*) *depressa*, Stimpson (?), p. 51, Pl. VII. fig. 2.
Chlorinoides coppingeri (Haswell), p. 53, Pl. VII. fig. 3.
Pisa (*Arctopsis*) *tribulus* (Linné), p. 55.
Hyastenus diacanthus (de Haan), p. 57.
Hyastenus planasius (Adams and White), p. 57.
Hyastenus oryx, A. Milne Edwards, p. 58.
Hyastenus elegans, n. sp., p. 58, Pl. VI. fig. 3.
Naxia hystrix, n. sp., p. 60, Pl. VI. fig. 4.
Naxia hirta (A. Milne Edwards), p. 61.
Scyra compressipes, Stimpson, p. 63, Pl. VII. fig. 4.
Notolopas brasiliensis, n. sp., p. 64, Pl. VIII. fig. 1.
Schizophrys aspera (Milne Edwards), p. 67.
Pseudomicippa (?) *varians*, Miers, p. 68.
Micippa spinosa (Stimpson), p. 70, Pl. VIII. fig. 2.
Micippa spinosa, var. *affinis*, Miers, p. 70, Pl. VIII. fig. 3.

Periceridæ.

Libinia smithii, n. sp., p. 73, Pl. IX. fig. 1.
Libinia gracilipes, n. sp., p. 74, Pl. IX. fig. 2.
Pericera cornuta, Milne Edwards. p. 76.
Picroceroides tubularis, n. gen. and sp., p. 77, Pl. X. fig. 1.
Macrocœloma trispinosa (Latreille), p. 80.
Macrocœloma septemspinosa (Stimpson), p. 80.
Macrocœloma concava, n. sp., p. 81, Pl. X. fig. 2.
Microphrys bicornutus (Latreille), p. 83.
Mithrax (*Nemausa*) *rostrata*, A. Milne Edwards, p. 85.
Mithrax cornutus, de Saussure, p. 87.
Mithrax hispidus (Herbst), var. *pleuracanthus*, Stimpson, p. 88.
Mithrax forceps (A. Milne Edwards), p. 88.
Mithrax coronatus (Herbst), p. 89.
Mithrax sp., p. 89, Pl. X. fig. 3.

Parthenopidæ.

Lambrus contrarius (Herbst), p. 94.
Lambrus longimanus (Linné), p. 95.
Lambrus affinis, A. Milne Edwards, p. 95.
Lambrus intermedius, Miers, p. 96, Pl. X. fig. 4.
Lambrus turriger, White, p. 96.
Lambrus guérinii, Capello, p. 96.
Lambrus serratus (Milne Edwards), p. 97.
Lambrus (*Aulacolambrus*) *hoplonotus*, Adams and White, p. 98.

Lambrus (*Aulacolambrus*) *hoplonotus*, Adams and White, p. 98.
Lambrus (*Aulacolambrus*) *hoplonotus*, var. *granulosus*, Miers, p. 98, Pl. X. fig. 5.
Lambrus (*Aulacolambrus*) *hoplonotus*, var. *longioculis*, Miers, p. 99.
Lambrus (*Parthenolambrus*) *massena*, Roux, p. 100.
Lambrus (*Parthenolambrus*) *massena*, var. *atlanticus*, Miers, p. 100.
Lambrus (*Parthenolambrus*) *expansus*, Miers, p. 100.
Lambrus (*Parthenolambrus*) *calappoides*, Adams and White, p. 101.
Cryptopodia fornicata (Fabricius), p. 102.
Heterocrypta granulata (Gibbes), p. 103.
Heterocrypta maltzani, Miers, p. 103.
Ceratocarcinus longimanus, Adams and White, p. 105.

CYCLOMETOPA or CANCROIDEA.

Cancridæ.

Cancer longipes, Bell, p. 110.
Carpilius maculatus (Linné), p. 111.
Atergatis floridus (Linné), p. 112.
Lophactæa lobata (Milne Edwards), p. 113.
Lophactæa granulosa (Rüppell), p. 114.
Lophozozymus (*Lophoxanthus*) *bellus*, Stimpson, var. *leucomanus*, Lockington, p. 115, Pl. XI. fig. 1.
Medæus haswelli, n. sp., p. 117, Pl. XI. fig. 2.
Actæa granulata (Audouin), p. 120.
? Actæa hirsutissima (Rüppell), p. 120.
Actæa nodulosa, White, p. 120.
Actæa hystrix, n. sp., p. 121, Pl. XI. fig. 3.
Actæa peronii (Milne Edwards), p. 122.
Actæa rufopunctata (Milne Edwards), var. *nodosa*, Stimpson, p. 122.
Atergatopsis granulatus, A. Milne Edwards, p. 123.
Xantho bidentatus, A. Milne Edwards, p. 126.
Xanthodes melanodactylus, A. Milne Edwards, p. 128.
Panopeus herbstii, var. *serratus*, (de Saussure), p. 129.
Micropanope spinipes, A. Milne Edwards (?), p. 130.
Etisus lævimanus, Randall, p. 132.
Carpilodes bellus (Dana), p. 134.
Zozymus æneus (Linné), p. 134.
Actæodes tomentosus (Milne Edwards), p. 135.
Leptodius exaratus, var. *sanguineus* (Milne Edwards), p. 138.
Leptodius punctatus, Miers, p. 138.
Phymodius monticulosus (Dana), p. 139.
Eurytium limosum (Say), p. 141.
Pseudozius bouvieri, A. Milne Edwards, var. *mellissii*, Miers, p. 143, Pl. XII. fig. 3.
Sphærozius nitidus, Stimpson, p. 144, Pl. XII. fig. 4.
Pilumnus africanus, A. Milne Edwards, p. 150, Pl. XIII. fig. 1.
Pilumnus spinifer, Milne Edwards (?), p. 150.
Pilumnus brasiliensis, n. sp., p, 151, Pl. XIII. fig. 2.
Pilumnus floridanus, Stimpson, p. 152, Pl. XIII. fig. 3.

Pilumnus fragosus, A. Milne Edwards, var., p. 153.
Pilumnus minutus, de Haan, var. *hirsutus*, p. 154.
Pilumnus globosus, Dana, p. 155.
Pilumnus dehaani, Miers, p. 155, Pl. XIV. fig. 1.
Pilumnus scabriusculus, Adams and White (?), p. 155.
Pilumnus normani, n. sp., p. 156, Pl. XIV. fig. 2.
Pilumnus longicornis, Hilgendorf, var., p. 157.
Pilumnus vestitus, Haswell, p. 159, Pl. XIV. fig. 3.
Pilumnus tomentosus, Latreille (?), p. 160, Pl. XIV. fig. 4.
Pilumnus rufopunctatus, Stimpson, p. 160, Pl. XIV. fig. 5.
Pilumnus pulcher, Miers, p. 161.
Pilumnus seminudus, Miers, p. 161.
Pilumnus labyrinthicus, Miers, p. 161.
Eriphia gonagra (Fabricius), p. 163.
Trapezia cymodoce (Herbst) (?), p. 166.
Trapezia guttata, Rüppell, var., p. 166, Pl. XII. fig. 1.
Trapezia areolata, var. *inermis*, A. Milne Edwards, p. 167.
Trapezia rufopunctata (Herbst), p. 167.
Trapezia rufopunctata, var. *intermedia*, n. sp., p. 168, Pl. XII. fig. 2.

Portunidæ.

Neptunus (*Neptunus*) *pelagicus* (Linné), p. 173.
Neptunus (*Neptunus*) *sayi*, A. Milne Edwards, p. 173.
Neptunus (*Neptunus*) *sanguinolentus* (Herbst), p. 174.
Neptunus (*Amphitrite*) *hastatus* (Linné), p. 175.
Neptunus (*Amphitrite*) *hastatoides* (Fabricius), p. 175.
Neptunus (*Amphitrite*) *tuberculosus*, A. Milne Edwards, p. 176.
Neptunus (*Amphitrite*) *rugosus*, A. Milne Edwards, p. 176.
Neptunus (*Amphitrite*) *gladiator* (Fabricius), p. 177.
Neptunus (*Amphitrite*) *gladiator*, var. *argentatus*, White, p. 177.
Neptunus (*Amphitrite*) *spinipes*, n. sp., p. 178, Pl. XV. fig. 1.
Neptunus (*Achelous*) *whitei*, (A. Milne Edwards), p. 179.
Neptunus (*Achelous*) *granulatus* (Milne Edwards), p. 180.
Neptunus (*Achelous*) *unispinosus* (Miers), p. 180.
Neptunus (*Achelous*) *depressifrons* (Stimpson), p. 181.
Neptunus (*Hellenus*) *spinicarpus* (Stimpson), p. 182.
Xiphonectes longispinosus, Dana, p. 183.
Scylla serrata (Forskål), p. 185.
Lupocyclus (*Parathranites*) *orientalis*, n. subgen. and sp., p. 186, Pl. XVII. fig. 1.
Cronius bispinosus, n. sp., p. 188, Pl. XV. fig. 2.
Goniosoma variegatum (Fabricius), p. 190.
Goniosoma variegatum, var. *bimaculatum*, nov., p. 191, Pl. XV. fig. 3.

Goniosoma cruciferum (Fabricius), p. 191.
Goniosoma ornatum, A Milne Edwards, p. 191.
Thalamonyx danæ, var. *gracilipes*, A. Milne Edwards, p. 192.
Thalamita admete (Herbst), p. 194.
Thalamita integra (Dana), p. 195.
Thalamita sima, Milne Edwards, p. 195.
Thalamita intermedia, n. sp. p. 196, Pl. XVI. fig. 1.
Thalamita sexlobata, n. sp., p. 196, Pl. XVI. fig. 2.
Thalamita prymna (Herbst), p. 197.
Thalamita stimpsoni, A Milne Edwards, p. 198.
Thalamita crenata, Rüppell, p. 199.
Portunus corrugatus (Pennant), p. 200.
Platyonychus bipustulatus, Milne Edwards, p. 202.
Platyonychus iridescens, n. sp., p. 202, Pl. XVII. fig. 2.
Lissocarcinus polybioides, Adams and White, p. 205.
Lissocarcinus lævis, n. sp., p. 205, Pl. XVII. fig. 3.
Podophthalmus vigil (Fabricius), p. 207.

Cyclinea.

Acanthocylus gayi, Milne Edwards and Lucas, p. 209.

Corystoidea.

Hypopeltarium spinulosum, White, p. 211. | *Gomeza bicornis*, Gray, p. 212.

Thelphusinea.

Thelphusa sinuatifrons (?), Milne Edwards, p. 214, Pl. XVIII. fig. 1.
Thelphusa (*Potamonautes*) *perlata*, Milne Edwards, p. 215.
Thelphusa (*Geothelphusa*) *dehaanii*, White, p. 215.

CATOMETOPA or OCYPODIIDEA.

Geocarcinidæ.

Geocarcinus lagostoma, Milne Edwards, p. 218, Pl. XVIII. fig. 2.
Cardiosoma guanhumi, Latreille, p. 220.
Cardiosoma armatum, Herklots, p. 220.
Cardiosoma carnifex (Herbst), p. 220.

Ocypodidæ.

Geryon (?) incertus, n. sp., p. 224, Pl. XVI. fig. 3.
Pilumnoplax heterochir, Studer, p. 227, Pl. XIX. fig. 1.
Pilumnoplax abyssicola, n. sp., p. 228, Pl. XIX. fig. 2.
Pilumnoplax vestita, de Haan, var. *sexdentata*, Haswell, p. 229.
Bathyplax typhlus, A. Milne Edwards, var. *oculiferus*, nov., p. 230, Pl. XX. fig. 3.
Litocheira kingsleyi, n. sp., p. 232, Pl. XXI. fig. 1.
Ceratoplax ciliata, Stimpson, p. 234, Pl. XIX. fig. 3.
Ceratoplax arcuata, Miers, p. 235.
Notonyx nitidus, A. Milne Edwards, p. 236.
Ocypoda ceratophthalma (Pallas), p. 238.
Ocypoda cursor (Linné), p. 240.
Ocpoda arenaria (Catesby), p. 240.
Gelasimus vocans (Linné), p. 242.
Gelasimus rubripes, Jacquinot and Lucas, p. 243.
Gelasimus tetragonon (Herbst), p. 243.
Gelasimus annulipes, Milne Edwards, p. 244.
Gonoplax sinuatifrons, n. sp., p. 246, Pl. XX. fig. 2.
Ommatocarcinus macgillivrayi, White, p. 247.
Macrophthalmus podophthalmus, Eydoux and Souleyet, p. 249.
Macrophthalmus serratus, Adams and White, p. 250, Pl. XX. fig. 1.
Hemiplax hirtipes, Heller, p. 251.
Euplax (*Chænostoma*) *boscii* (Audouin), p. 252.

Grapsidæ.

Nautilograpsus minutus (Linné), p. 254.
Grapsus maculatus (Catesby), p. 255.
Grapsus strigosus (Herbst), p. 256.
Leptograpsus variegatus (Fabricius), p. 257.
Metopograpsus messor (Forskål), p. 258.
Metopograpus messor, var. *frontalis*, Miers, p. 258.
Pachygrapsus transversus, Gibbes, p. 259.
Geograpsus grayi (Milne Edwards), p. 261.
Pseudograpsus albus, Stimpson, p. 262.
Platygrapsus depressus (de Haan), p. 263.
Brachynotus (*Heterograpsus*) *penicillatus* (de Haan), p. 264.
Varuna litterata (Fabricius), p. 265.
Epigrapsus politus, Heller, p. 266.
Goniopsis cruentatus, Latreille, p. 267.
Helice latreillei, Milne Edwards, var., p. 268, Pl. XXI. fig. 2.
Helice crassa, Dana, p. 269.
Sesarma müllerii, A. Milne Edwards, p. 270, Pl. XXI. fig. 3.
Sesarma schüttei, Hess, p. 271.
Sesarma (*Holometopus*) *aubryi*, A. Milne Edwards, p. 271.
Plagusia depressa (Fabricius), p. 272.
Plagusia immaculata, Lamarck, p. 273, Pl. XXII. fig. 1.
Plagusia chabrus (Linné), p. 273, Pl. XXII. fig. 1*d*.

PINNOTHERIDÆ.

Pinnotheres villosulus, Guérin-Méneville, p. 277, Pl. XXII. fig. 2.
Mycteris longicarpus (Latreille), p. 278.
Mycteris platycheles, Milne Edwards, p. 279.
Hymenosoma orbiculare (Desmarest), p. 280.
Halicarcinus planatus (Fabricius), p. 281.
Halicarcinus ovatus, Stimpson, p. 282.

OXYSTOMATA or LEUCOSIIDEA.

CALAPPIDÆ.

Calappa flammea (Herbst), p. 284, Pl. XXIII. fig. 1.
Calappa hepatica (Linné), p. 285.
Calappa granulata (Linné), p. 285.
Calappa gallus (Herbst), p. 286.
Calappa lophos (Herbst), p. 286.
Calappa depressa, n. sp., p. 287, Pl. XXIII. fig. 2.
Paracycloïs milne-edwardsii, n. gen. and sp., p. 289, Pl. XXIV. fig. 1.
Mursia cristimana (Desmarest), p. 291.
Mursia curtispina, n. sp., p. 291, Pl. XXIV. fig. 2.
Cryptosoma cristatum, Leach (*ined.*), Brullé, p. 293.

MATUTIDÆ.

Matuta victrix (Fabricius), p. 295.
Matuta victrix, var. *crebrépunctata*, Miers, p. 295.
Matuta banksii, Leach, p. 295.
Matuta lævidactyla, Miers, p. 296.
Matuta inermis, Miers, p. 296.

LEUCOSIIDÆ.

Myrodes eudactylus, Bell, p. 298.
Arcania septemspinosa (Fabricius), p. 300.
Ixa cylindrus (Fabricius), var. *megaspis*, Adams and White, p. 301.
Iliacantha intermedia, n. sp., p. 302, Pl. XXVI. fig. 3.
Ebalia lambriformis (Bell), p. 306.
Ebalia lævis (Bell), p. 306.
Ebalia tuberculosa (A. Milne Edwards), p. 306, Pl. XXV. fig. 1.
Ebalia (*Phlyxia*) *crassipes*, Bell, p. 307.
Ebalia (*Phlyxia*) *intermedia*, n. sp., p. 308, Pl. XXV. fig. 2.
Ebalia (*Phlyxia*) *undecimspinosa* (Kinahan), var. *orbicularis*, Haswell, p. 309.
Ebalia (*Phlyxia*) *quadridentata* (Gray), var. *spinifera*, nov., p. 309, Pl. XXV. fig. 3.
Ebalia (*Phlyxia*) *dentifrons*, n. sp. p. 310, Pl. XXV. fig. 4.
Persephona punctata (Browne), p. 312, Pl. XXV. fig. 5.
Myra fugax (Fabricius), p. 313.

Myra affinis, Bell, p. 315.
Myra australis, Haswell, p. 315.
Myra darnleyensis, Haswell, p. 315.
Randallia granulata, n. sp., p. 317, Pl. XXVI. fig. 1.
Lithadia cariosa, Stimpson, var., p. 319, Pl. XXVI. fig. 2.
Merocryptus lambriformis, A. Milne Edwards, p. 320.
Philyra platycheira, de Haan (?), p. 321.
Leucosia australiensis, n. sp., p. 322, Pl. XXVII. fig. 1.
Leucosia haswelli, n. sp., p. 324, Pl. XXVII. fig. 2.
Leucosia ocellata, Bell, p. 325.
Leucosia whitei, Bell, p. 325.
Leucosia craniolaris (Linné), p. 325, Pl. XXVII. fig. 3.

Dorippidæ.

Dorippe facchino (Herbst), p. 328.
Dorippe japonica, v. Siebold, p. 328.
Ethusa microphthalma, Smith, p. 329.
Ethusa orientalis, n. sp., p. 330, Pl. XXVIII. fig. 1.
Ethusa (*Ethusina*) *challengeri*, n. sp., p. 331, Pl. XXVIII. fig. 2.
Ethusa (*Ethusina*) *gracilipes*, n. sp., p. 332, Pl. XXIX. fig. 1.
Ethusa (*Ethusina*) *gracilipes*, var. *robusta*, nov., p. 333, Pl. XXIX. fig. 2.
Cymopolia caronii, Roux, p. 334.
Cymopolia jukesii, White, p. 335.

DESCRIPTIONS OF THE GENERA AND SPECIES.

BRACHYURA.

Cancri Brachyuri, Lamarck (pt.), Syst. des Anim. sans Vert., p. 148, 1801.
Brachyures, Milne Edwards, Hist. Nat. Crust., i. p. 247 (1834).
Brachyura, Leach (pt.), Trans. Linn. Soc. Lond., vol. xi. p. 307, 1815.
,, Latreille (pt.), Fam. Nat. du Règne Anim., p. 267, 1825.
,, Dana, U. S. Expl. Exped., vol. xiii. Crust. 1, p. 58, 1852.
,, Miers, Cat. New Zeal. Crust., p. 1, 1876.
,, Claus (pt.), Grundzüge der Zoologie, ed. 4, vol. i. p. 632, 1880.
,, Haswell, Cat. Australian Stalk and Sessile-Eyed Crust., p. 1, 1882.

The cervical and thoracic regions of the body are covered by the carapace, which is greatly developed. The antennulary fossettes and orbits are usually well defined. The buccal cavity is distinctly defined in front. The sternum is never linear, the vulvæ are situated upon the sternum. The post-abdomen, in the male, is short; inflexed beneath the cephalothorax, and usually closely applied to it. The flagella of the antennules and antennæ are usually short or rudimentary. The exterior maxillipedes are operculiform and usually completely close the buccal cavity. The anterior legs are developed as perfectly chelate limbs (chelipedes). The ambulatory legs (*i.e.*, those of the second to the fifth pairs) are never perfectly chelate; but rarely, in those forms which establish the passage to the Anomura (*e.g.*, the Dorippidæ) are feeble and imperfectly prehensile.

The Brachyura, or short-tailed, *i.e.*, true crabs, are, as stated in the introductory portion of this Report, here limited in the sense long ago indicated by Profs. H. Milne Edwards and J. D. Dana; who may perhaps still be regarded as the leading authorities on the systematic classification of the Crustacea; and are subdivided into the four secondary divisions or subtribes, Oxyrhyncha, Cyclometopa, Catometopa, and Oxystomata.

The recent species, as is well known, are extremely numerous, for the most part marine, and inhabitants of the shores or shallower waters of the temperate, subtropical, or tropical regions of the globe; but few species occurring in the Arctic or Antarctic circumpolar areas of distribution. Others (Geocarcinidæ, Thelphusidæ) are terrestrial or fluviatile, and a few (Pinnotheridæ) inhabit the shells, &c., of animals of other groups. Until recently, little was known of the bathymetrical distribution of these animals, but the Challenger and other recent expeditions have shown that species, especially of the somewhat aberrant family Dorippidæ, may occur in the abysses of the ocean to a depth exceeding 1500 fathoms.

OXYRHYNCHA or MAIOIDEA.

Oxyrhynchi, Latreille (pt.), Hist. Nat. Crust., vol. vi. p. 85, 1803.
Oxyrhinques, Milne Edwards, Hist. Nat. Crust., vol. i. pp. 263, 266, 1834.
Canceriens Cryptopodes, Milne Edwards, *tom. cit.*, pp. 368, 369, 1834.
Maioidea vel *Oxyrhyncha*, Dana, U.S. Expl. Exped., vol. xiii. Crust. 1, pp. 66, 75, 1852.
Oxyrhyncha, Miers, Cat. New Zeal. Crust., p. 2, 1876; Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 634, 1879.

Carapace more or less narrowed in front, and usually rostrated; with the branchial regions considerably developed. Hepatic regions small. Epistome usually large. Buccal cavity quadrate, with the anterior margin straight. Branchiæ nine in number; their efferent channels terminating at the sides of the endostome or palate. Antennules longitudinally plicated. The carpal joint of the endognath of the exterior maxillipedes is articulated at the summit or at the antero-internal angle of the merus. The verges of the male are inserted at the bases of the fifth ambulatory legs.

The Oxyrhyncha, thus defined, constitute as a whole a very natural group; which however is connected with the Cyclometopa by almost insensible gradations, and no single character can be mentioned which will suffice to distinguish them universally from the other Brachyura.

Legion I. MAIINEA.

Maiinea, Dana, U.S. Expl. Exped., vol. xiii., Crust. i. pp. 76, 77, 1852.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 640, 1879.

Basal antennal joint well developed, inserted beneath the eyes, and usually occupying a great part of the infraocular space.

Family I. INACHIDÆ.

Inachidæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. pp. 640–642, 1879.

Eyes non-retractile, or retractile against the sides of the carapace. Usually the orbits are not defined, but there is often a well-developed præocular and postocular spine. Basal joint of the antennæ generally slender, sometimes moderately enlarged.

The carapace varies in shape, being subtriangulate or oblong-triangulate or subpyriform, rarely suborbiculate. Rostrum simple or bifid, sometimes very short. Chelipedes

with the fingers never excavated at the tips. Ambulatory legs sometimes very long. Post-abdomen of male and female four to seven-jointed, two or three of the joints often coalescent.

Subfamily 1. LEPTOPODIINÆ.

Leptopodiinæ, Miers, *tom. cit.*, p. 642, 1879, *et synonyma.*

Eyes slender, non-retractile, and laterally projecting. Præocular and postocular spines minute or wanting. Basal antennal joint very slender throughout its length.

The genera have been enumerated in my memoir referred to above.

Leptopodia, Leach.

Leptopodia, Leach, Zool. Miscell., vol. ii. p. 15, 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 275, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 643, 1879.

Carapace triangulate, with the posterior margin straight, and not prolonged over the posterior segment of the thorax; there are no defined orbits, but a distinct, although small, postocular spine. The rostrum is very long, simple, and horizontal, with the lateral margin serrate. The endostome or palate is without longitudinal ridges. The epistome is very large. The post-abdomen is six-jointed, with the penultimate and terminal segments coalescent. The eyes are short and non-retractile. The antennules are longitudinally plicated. The basal joint of the antennæ is elongated and very slender, and the elongated flagellum is in great part concealed beneath the rostrum. The ischium of the exterior maxillipedes is somewhat produced at its antero-internal angle; the merus is obversely triangulate, truncated at the distal extremity, and bears the next joint at its antero-external angle. The chelipedes (in the adult male) are rather slender and greatly elongated, with the merus, carpus, and palm subcylindrical; fingers much shorter than the palm, distally acute, and dentated on the inner margins. The ambulatory legs are very slender and extremely elongated, dactyli styliform; the merus-joints of all the legs are spinuliferous.

The single species (*Leptopodia sagittaria*) occurs, as A. Milne Edwards has shown, in the Gulf of Mexico and West Indian Seas, at the Canary and Cape Verde Islands, and Madeira, and also on the coast of Brazil and on the west coast of Central and South America, southward to Chili.[1]

Leptopodia sagittaria has already been recorded by A. Milne Edwards from considerable depths at several localities in the West Indian Seas, *e.g.*, at Barbados (94 fathoms)

[1] There are in the British Museum Collection specimens from Angola (Dr. Welwitsch). I have seen no examples of the Chilian variety designated by A. Milne Edwards, *L. modesta*, in which the cardiac and branchial regions of the carapace are more swollen and the rostrum shorter and raised at the apex.

and Santa Cruz (115 fathoms), but these by no means indicate the extreme limit of its bathymetrical range; specimens having been recently received by the British Museum from Captain E. Cole, taken off Jamaica in 600 fathoms, and in the Mona Channel, West Indies, in 814 fathoms.

Leptopodia sagittaria (Fabricius).

Cancer sagittarius, Fabricius, Ent. Syst., ii. p. 442, 1793.
Leptopodia sagittaria, Leach, Zool. Miscell., ii. p. 16, pl. lxvii., 1815.
„ „ Milne Edwards, Hist. Nat. Crust., vol. i. p. 276, 1834; Atlas, in Cuvier, Règne Animal, Crust., ed. 3, pl. xxvi. fig. 1.
„ „ A. Milne Edwards, Études sur les Crust. Podophthalmaires in Miss. Sci. au Mexique et dans l' Amérique Centrale, pt. v. p. 172, 1878; and references to literature.

Fully grown specimens were obtained at Madeira, and St. Vincent, Cape Verde Islands, also smaller examples at Bahia in shallow water, 7 to 20 fathoms. Another young female was dredged at Barra Grande, south of Pernambuco, in 30 to 350 fathoms (Station 122), in lat. 9° 5′ to 9° 10′ S., long. 34° 49′ to 34° 53′ W.

An adult male from Madeira measures as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	29½	62·5
Breadth of carapace,	9	19

Metoporaphis, Stimpson.

Metoporaphis, Stimpson, Ann. Lyc. Nat. Hist., New York, vol. vii. p. 198, 1860.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 643, 1879.

This genus, which is nearly allied to *Leptopodia*, is distinguished by its uneven and tuberculated carapace, the exposed flagella of the antennæ which are visible at the sides of the rostrum in a dorsal view, and by the very considerable development of the median distal spine of the merus of the ambulatory legs.

In *Metoporaphis forficulatus*, which is the only species I have examined, the chelipede differs markedly from that of *Leptopodia*, the palm (in the adult) being much shorter than the dactyle and pollex, which are slender, gaping, incurved, and meet only at the tips.

The ascertained range of this genus is from Charleston Harbour (whence the type was obtained) southward to Barra Grande on the Brazilian coast; the species are apparently of very rare and local occurrence. But two have been described, which must be regarded as doubtfully distinct one from the other; *Metoporaphis calcarata* (Say), and *Metoporaphis forficulatus*, A. Milne Edwards.

The description of the former species (from a very imperfect type) is, however, too brief for certain identification, and therefore Milne Edwards' designation for the Challenger specimens is retained.

Metoporaphis forficulatus, A. Milne Edwards.

Metoporaphis forficulatus, A. Milne Edwards, Crust. in Miss. Sci. au Mexique, pt. v. p. 174, pl. xxxi. fig. 3, 1878.

A male in somewhat mutilated condition was dredged off Bahia in 7 to 20 fathoms. A female in very fragmentary condition dredged at Barra Grande, south of Pernambuco, at Station 122, in 30 to 350 fathoms, also probably belongs to this species, but the carapace is broader, and the tubercles of its dorsal surface are less distinct.

In both specimens there is a spinule upon the outer surface of the basal joint of the antennæ, and another at the distal extremity of the same joint which are not shown in Milne Edwards' figures of this appendage (fig. 3*a*), but I have little doubt of the correct identification of the specimens. The type was from Guiana.

The dimensions of the male are as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	6½	13·5
Breadth of carapace, about	3	6·5
Length of chelipede, about	8	17

Stenorhynchus, Lamarck.

Stenorhynchus, Lamarck (pt.), Hist. des Anim. sans Vert., v., p. 236, 1818.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 278, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 643, 1879.

The carapace is subtriangulate, with a straight posterior margin, and is more or less distinctly spinose above; there is usually no postocular spine. The rostrum is composed of two slender, straight, contiguous spines. The post-abdomen has but six distinct segments. The eyes are slender and project laterally. The merus of the outer maxillipedes is somewhat elongated and distally rounded, and articulates at its summit with the next joint. The chelipedes have the palms somewhat inflated, the ambulatory legs are slender and much elongated, with the dactyli nearly straight or those of the fifth pair only slightly falcated.

The species, which are small and not numerous, occur commonly in the temperate waters of the northern and southern hemisphere (Australian and South African Seas) at moderate depths, and more rarely in deep water [1] and in the Tropical Seas.

[1] A. Milne Edwards mentions the occurrence of *Stenorhynchus longirostris* in the Mediterranean at 420 metres. (Rapport sur la faune marine dans les grandes profondeurs de la Mediterranée et de l'Ocean Atlantique, p. 18, 1882.)

The following are the forms with which I am acquainted :—

Stenorhynchus rostratus (Linné) = *Cancer phalangium*, Pennant, *Stenorhynchus inermis*, Heller. Seas of Europe; Mediterranean (to 40 fathoms, Heller); Shetlands (to 70 fathoms, Norman), &c.; Cape Verde Islands (to 38 fathoms, Studer).

Stenorhynchus rostratus, var. *spinulosus*, Miers. Senegambia, Goree Island (9 to 15 fathoms); coast of Portugal; Ireland (20 fathoms).

Stenorhynchus longirostris (Fabricius) = *Leptopodia tenuirostris*, Leach. Seas of Europe; Mediterranean (to 420 fathoms, A. Milne Edwards).

Stenorhynchus ægyptius, Milne Edwards. Mediterranean; South British Seas.

Stenorhynchus czernjawskii, Brandt. Black Sea. (Perhaps not distinct from *Stenorhynchus longirostris*).

Stenorhynchus falcifer, Stimpson. Cape of Good Hope (12 to 18 fathoms).

Stenorhynchus spinifer, n. sp. St. Paul's Rocks (10 to 80 fathoms).[1]

Stenorhynchus falcifer, Stimpson (Pl. I. fig. 1).

Stenorhynchus falcifer, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 219, 1857.

Two males and a female were dredged in Simon's Bay, 5 to 18 fathoms, November 19, 1873; where also the types of the species were collected.

Carapace moderately convex, triangulate, with a straight or slightly concave posterior margin; with a long median spine on the gastric region, in front of which are usually two smaller spines, the three forming a triangle; a prominent median spine on the cardiac region and behind this usually a smaller intestinal spine or tubercle; two small dorsal spines or tubercles on each branchial region; a lateral spine on each hepatic and branchial region, and commonly a few small lateral spinules beneath these spines. Rostrum one-fourth to one-half the length of the carapace, composed of two straight slender contiguous spines, which are usually directed obliquely upwards. Post-abdomen in both sexes six-jointed, a median prominence on each segment, eyes of moderate length, a small distal tubercle on the upper surface of the corneæ. Basal antennal joint slender, with a small distal spine (there is also usually a small tubercle near to its base on the epistome and another near to the antero-lateral angles of the buccal cavity, and a small postocular tubercle, which may represent the postocular spine), the antennal flagella are exposed and visible in a dorsal view at the sides of the rostrum. Chelipedes (in the adult male) about twice as long as the carapace; merus with some small spines on its upper and lower margins and with a strong spine at the distal extremity of its upper

[1] As has been noted below, *Stenorhynchus curvirostris*, A. Milne Edwards, from Bass Strait, and *Stenorhynchus fissifrons*, Haswell, from Port Jackson and New Zealand, may belong to the genus *Achæopsis*; *Stenorhynchus brevirostris*, Haswell, is, I think, a species of *Achæus*.

margin. Carpus and palm with some small spines on their superior margins, and with the lower margins minutely tuberculate or spinuliferous; palm compressed and very slightly turgid in the middle, and slightly longer than the wrist, fingers about as long as palm, compressed, incurved toward the apices and minutely dentate on the inner margins, which are nearly in contact at the base. Ambulatory legs elongate and very slender; merus-joints with a strong spine (which is sometimes bifid) at the distal extremity of the upper margin; dactyli slender, in the fourth and fifth legs slightly falciform. Colour yellowish-brown or reddish. Carapace and chelipedes minutely pubescent, and there are some longer hairs on the carapace near the bases of the spines and on the margins of the chelipedes and ambulatory legs.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	7½	15·5
Breadth of carapace, nearly	4½	9
Length of a chelipede, nearly	11	23
Length of a penultimate ambulatory leg (the only one remaining attached),	18	38

Stenorhynchus spinifer, n. sp. (Pl. I. fig. 2).

The carapace is subtriangulate, longer than broad, and not constricted behind the eyes, and bears a median spine upon the gastric region (not shown in the figure) and another on each side, placed midway between this and the postocular spine; there existed also apparently a rounded tubercle or prominence upon the cardiac region, and possibly others near the front of the branchial region. The spines of the rostrum being broken, their exact length cannot be given, but they exceed half the length of the carapace. There is a strong spine on the upper margin of the orbit in front of the eye, and also a strong postocular spine.

The eye-peduncles are moderately robust; the corneæ considerably thicker than the peduncles, with a small tubercle on the anterior and upper surface, the bases of the antennules are lodged in very deep longitudinal fossettes; the very slender basal joints of the antennæ, which are not joined with the front at the distal extremities, are armed with a longitudinal series of five spinules, whereof the second from the distal extremity is the longest; the following joint is short, the next considerably elongated, slightly longer than the basal joint; the flagella filiform; the merus-joint of the outer maxillipedes has its antero-internal angle slightly produced and rounded, and has two or three spinules on its exterior face, near to the outer margin; the inner margin is fringed with long hairs. The carapace is scantily clothed with fine hairs. Colour (in spirit) yellowish-brown.

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum,	4½	9·5
Breadth of carapace, about	4	8·5

This species is distinguished from all of the genus with which I am acquainted by the spine on the upper margin of the orbit in front of the eye, and the strong postocular spine.

The single mutilated specimen (a male) was dredged off St. Paul's Rocks in 10 to 80 fathoms.

It is described from a single crushed and mutilated specimen, with broken rostrum, and wanting all the legs, and the description and figures are necessarily very imperfect.

Achæus, Leach.

Achæus, Leach, Malacostraca Podophthalmata Britanniæ, pl. xxii. fig. c., 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 281, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 643, 1879.

This genus is very nearly allied to *Stenorhynchus*, and it is in fact only distinguished from it by the absence of rostral spines; the rostrum in *Achæus* being composed merely of two small acute or subacute lobes. The dactyli of the fourth and fifth ambulatory legs are usually but not invariably very distinctly falcated. The merus of the outer maxillipedes in certain species (*e.g.*, the typical *Achæus cranchii*) is shorter than in *Stenorhynchus*, and distally truncated.

The species, which are small, are distributed nearly as those of *Stenorhynchus*, and two or three are found in the Seas of Japan; whence, I believe, *Stenorhynchus* has not been as yet recorded. On the other hand, I am not aware that *Achæus* has been recorded from any intertropical locality.

The following are the species known; some of them may prove on careful revision to be mere varieties:—

Achæus cranchii, Leach = *Macropodia gracilis*, Costa. European Seas (Mediterranean, 70 to 75 métres, A. Milne Edwards).
Achæus lacertosus, Stimpson = *Achæus breviceps*, Haswell. East and North Australia.
Achæus japonicus, de Haan. Japan (to 50 fathoms).
Achæus tuberculatus, Miers. Corean Channel (to 36 fathoms).
Achæus lorina, Adams and White. Mindanao and Borneo.
Achæus spinosus, Miers. Corean Channel (to 30 fathoms).
Achæus affinis, Miers. North-East and West Australia.
Achæus brevirostris (Haswell). East and North-East Australia.
Achæus lævioculis, Miers. Seychelles (4 to 12 fathoms).
Achæus tenuicollis, n. sp. Port Phillip and Bass Strait (33 to 38 fathoms).

Achæus japonicus, de Haan.

Achæus japonicus, de Haan, Crust. in Siebold, Fauna Japonica, p. 99, pl. xxix. fig. 3 and pl. H., 1839.

A single small female dredged near Kobi, Japan, in 50 fathoms (Station 233A), lat. 34° 38′ N., long. 135° 1′ E., is referred with doubt to this species, as the ocular peduncles are unispinose, not quadrispinose, as in the description (but not the figure) of de Haan. The fourth and fifth legs, also, are more distinctly falcated than in his figure.

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum, ...	5½	11·5
Breadth of carapace, ...	4	8·5

Achæus tenuicollis, n. sp. (Pl. I. fig. 3).

The body is thinly clothed with short curled hairs; the limbs with similar hairs, interspersed among which are some longer ones. The carapace is subtriangulate, little longer than broad, with a neck-like constriction behind the orbits, and armed with spines as follows:—Three conical spines upon the gastric and another upon the cardiac region, two shorter conical spines or tubercles, whereof the anterior is the smallest, on each branchial region, behind these one very small on the posterior margin of the carapace, and another on the sides of the branchial regions above the bases of the chelipedes; also a small spine upon the rounded, lateral, hepatic protuberance, and another behind this, on the pterygostomian region; there is also a strong spinule on the upper margin of the orbit, above the eye-peduncles. The lobes of the rostrum are short, and terminate each in a spine. The sternal surface of the body bears a few spinules. The post-abdomen of the male is, as usual, six-jointed (the two last joints having coalesced). The eye-peduncles are robust, with the corneæ protuberant; a small spinule exists on the inferior margin of the eye-peduncle, and another on the upper margin of the eye, near the distal extremity. The antennules are lodged in deep longitudinal fossettes; the very slender basal joint of the antennæ is joined with the front at its distal extremity, and bears several small spinules on its inferior surface, the following joint is short, the next about as long as the basal joint, flagella slender; the ischium-joint of the outer maxillipedes is produced at its inner and distal angle which is rounded, and bears several spinules on its outer surface, as does also the merus-joint which is rounded, not truncated, at the distal extremity where it bears the next joint. The chelipedes (in the male) are rather slender, and longer than the body; with the joints clothed with rather long hairs; ischium and merus-joints with a series of spinules on their antero- and postero-inferior faces, wrist about as long as palm, with a few spinules hardly discernible amid the hairs which clothe this joint, palm slightly compressed, not dilated, armed with spinules on its upper and lower margins,

fingers about as long as palm, and slightly incurved at the apices which are nearly destitute of hair; the ambulatory legs are very slender and elongated; the dactyli of the first three pairs are short and nearly straight, in the last pair only are they slightly falciform. Colour (in spirit), light yellowish-brown.

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum, ...	3	6·5
Greatest breadth of carapace, about	2½	5
Length of a chelipede, about	5½	12
Length of third ambulatory leg, about	13	28

The description is wholly taken from an adult male, but applies also in nearly every particular to the adult female.

Of *Achæus tenuicollis* a male and female were dredged off the entrance to Port Phillip, in 33 fathoms, lat. 38° 22′ 30″ S., long. 144° 36′ 30″ E. (Station 161); also an adult and smaller female, off East Moncœur Island, Bass Straits, 38 fathoms, lat. 39° 10′ 30″ S., long. 146° 37″ E. (Station 162).

This species is apparently most nearly allied to *Achæus lorina*, Adams and White,[1] from Mindanao, and to *Achæus spinosus*, Miers,[2] from the Japanese Seas; and the three indeed may possibly prove to be varieties of one and the same form, but with the material at present available for comparison I have not ventured to unite them. From *Achæus lorina*, *Achæus tenuicollis* is distinguished by the more numerous spines of the carapace, and relatively shorter, though still elongated legs; the specimens designated *Achæus lorina* in the British Museum collection are, I may add, apparently not those from which the species was described and figured. *Achæus spinosus* differs in the bilobated spine of the cardiac region, the much more strongly-developed chelipedes of the male, and the proportionately shorter ambulatory legs.

Podochela, Stimpson.

Podochela, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 194, 1860.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 643, 1879.
„ A. Milne Edwards, Crust. in Miss. Sci. au Mexique, pt. v. p. 189, 1879, and synonyma.
Coryrhynchus, Kingsley, Proc. Acad. Nat. Sci. Philad., p. 384, 1879.

The carapace is triangulate and somewhat depressed, with the gastric region prominent and narrow. Rostrum short and simple; either acute (subgenus *Podochela*) or hood-shaped and rounded at the distal extremity (subgenus *Coryrhynchus*). The post-abdomen (in the male) has the sixth and seventh segments coalescent. The eyes are non-retractile and project laterally. The basal antennal joint is narrow and longitudinally carinated,

[1] Zoology of H.M.S. "Samarang," Crust., p. 3, pl. xi. fig. 2. 1848.
[2] *Proc. Zool. Soc. Lond.*, p. 25, 1879.

but is without distal spines or teeth. The chelipedes (in the male) are moderately robust, and the palm is slightly turgid (as in *Stenorhynchus*). The ambulatory legs are slender and somewhat elongated; the dactyli short and retractile.

M. Milne Edwards has united *Coryrhynchus*, Kingsley (=*Podonema*, Stimpson, *nom. præoc.*) with *Podochela*, but it may be convenient to retain this term as a subgeneric designation for the species with a distally-rounded and (usually) hood-shaped rostrum.

The species which have been enumerated by Milne Edwards, with one exception (*Podochela vestita*, Stimpson, from California, Cape St. Lucas) inhabit the Gulf of Mexico and Caribbean Sea, where they are found in shallow water and in depths not exceeding 60 fathoms (as at present recorded).

By the Challenger researches, however, the range of *Podochela riisei* is extended southward to the Brazilian coast, and its bathymetrical range to (possibly) 350 fathoms.

Podochela riisei (Stimpson).

Podonema riisei, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 196, pl. ii. fig. 1, 1860; Bull. Mus. Comp. Zoöl. Cambridge, vol. ii. p. 126, 1870.

Dryope falcipoda, Desbonne and Schramm, Crust. de la Guadeloupe, p. 2.

Podochela reisei, A. Milne Edwards, Crust. in Miss. Sci. au Mexique, pt. v. p. 193, pl. xxxiv. fig. 1, 1879.

Coryrhynchus riisei, Kingsley, American Naturalist, vol. xiii. p. 585, 1879; Proc. Acad. Nat. Sci. Philad., p. 384, 1879.

Two males and two females were collected at Bermuda in shallow water, and a male in mutilated condition south of Pernambuco, Brazil (Station 122, 30 to 350 fathoms).

These specimens have the tuberculiform prominences of the gastric region of the carapace less distinctly defined than in the specimen figured by Milne Edwards. In all of them the ridges upon the pterygostomian regions, defining the afferent channels to the branchiæ are very distinctly developed.

The largest male has the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, about	11½	24·5
Breadth of carapace,	9½	20
Length of a chelipede,	13	27·5
Length of first ambulatory leg,	31	65·5

Subfamily II. INACHINÆ.

Inachinæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 644, 1879; et synonyma.

Eyes slender and retractile. Præocular spine usually wanting, postocular distinct. Basal antennal joint usually very slender throughout its length, not narrowing distally.

In the typical species the margin of the carapace often forms a slight rim over the

bases of the eye-peduncles (but there are no distinct orbits). The merus of the exterior maxillipedes is sometimes distally rounded, the palms of the chelipedes are often somewhat inflated. The ambulatory legs are slender and often very long.

To the genera enumerated by me in 1879, as belonging to this group, the following are probably to be added:—

Anisonotus, A. Milne Edwards.
Anasimus, A. Milne Edwards.
Apocremnus, A. Milne Edwards.
Ergasticus, A. Milne Edwards.
Lispognathus, A. Milne Edwards.
Scyramathia, A Milne Edwards.
Trachymaia, A. Milne Edwards.
Gonatorhynchus, Haswell.
Platymaia, n. gen.
Cyrotomaia, n. gen.
Echinoplax, n. gen.

Anisonotus apparently establishes the transition between *Inachoides* in this group, and the Leptopodiinæ.[1]

Platymaia, n. gen.

Carapace depressed; suborbiculate. Rostrum short, apparently tridentate, the median lobe arising from the distal end of the interantennulary septum. No præocular but a supra and postocular spine. Epistoma very small, transverse. Post-abdomen (in the female) narrowest at base and broadening distally, thus obovate and subtruncated at the distal extremity, with all the segments distinct. Eyes short, with a distal tubercle, corneæ somewhat dilated. Antennæ with a short and slender basal peduncular joint, which does not reach the front; the flagellum is well developed. Exterior maxillipedes with the ischium-joint rather broad, with a spine at the antero-internal angle; the merus is slenderer than the ischium, articulating with the next joint at its antero-internal angle, which is not emarginate. Chelipedes (in the female) rather slender and short, spinuliferous; spines of merus long. Ambulatory legs very considerably elongated; those of the first pair having the fourth to last joints (merus to dactyl) armed with strong spines, which are longest on the anterior margin of the penultimate joints; the second to last legs almost devoid of spines, with the penultimate joints dilated and compressed (as in *Eurypodius*), and ciliated on the anterior margins; dactyli elongated, slender and slightly arcuated.

Platymaia is not very nearly allied to any genus of this family known to me. Its nearest affinities are perhaps with *Euprognatha*, Stimpson,[2] but it is at once distinguished by the depressed and suborbiculate form of the carapace and the dilatation of the

[1] Professor S. I. Smith has recently proposed the designation *Anamathia* in place of *Amathia*, Roux, which name was previously used. *Proc. U.S. Nat. Mus.*, vol. vii. p. 493, 1884.

[2] *Bull. Mus. Comp. Zoöl.*, vol. ii. p. 122, 1870.

penultimate joint of the ambulatory legs. As in *Euprognatha rastellifera*, the rostrum, on account of the prominence of the median spine of the interantennulary septum, is apparently trifid; but the spines on the anterior margins of the joints of the ambulatory legs, which in *Euprognatha rastellifera* are very small, are in this species enormously developed on the ambulatory legs of the first pair. The basal antennal joint does not, as in most genera of the Inachidæ, attain to the frontal margin.

This genus and the one which follows are among the most remarkable of the Challenger Brachyura, and are of especial interest as being Malayasian representatives of a section of the subfamily Inachinæ hitherto represented only by types from Eastern America, and which Stimpson[1] separated as a distinct subfamily, Collodinæ, on, as I think, insufficient grounds.[2]

Platymaia wyville-thomsoni, n. sp. (Pl. II. fig. 1).

Carapace depressed, suborbiculate, with the cervical suture very strongly defined, closely granulated over the whole of its upper surface; some of the granules (*e.g.*) in the median line of the gastric region and on the cardiac and front of the branchial regions being of larger size. The median (or interantennulary) lobe of the short rostrum is longest and acute; the lateral lobes very short and obtuse; the supraocular spines small, the postocular longer; behind these there are spinules on the hepatic and pterygostomian regions and two or three on the sides of the branchial regions in front; there are also lobes, armed with one to four spinules, between the bases of the third and fourth and fourth and fifth legs; the anterior margin of the buccal cavity has a truncated and denticulated lobe at its antero-external angle; the basal segment of the post-abdomen (in the female) is granulated and spinuliferous; the others are granulated only; the first, fifth, and sixth segments longer than the others, the last segment widely transverse; the short basal antennal joint bears two inferior spinules placed near to the distal extremity, the two following joints of the peduncle are short, slender, and nearly equal; both the ischium and merus-joints of the outer maxillipedes are spinuliferous on their outer surface, and the merus bears also several spinules at and near to its antero-external angle; the chelipedes are about as long as the carapace (with rostrum); merus, carpus, and palm thinly setose and spinuliferous; merus with some longer spines on its antero- and postero-inferior surfaces; carpus short, palm about as long as fingers, slightly compressed, nearly smooth on its inner surface, fingers slender, straight, acute, and minutely denticulated on their inner margins; the first pair of ambulatory legs are (roughly) three and a half times the length of the carapace to base of rostrum, with all the joints spinuliferous, the spines on the anterior margins of the merus and penultimate joints (usually) alternately longer and shorter, the penultimate joint with the spines greatly elongate, rastelliform,

[1] *Bull. Mus. Comp. Zoöl.*, vol. ii. p. 119, 1870.

[2] *Vide Journ. Linn. Soc. Lond.*, vol. xiv. p. 644, 1879.

several of the spines of the dactyl are also very long; the second to fourth ambulatory legs, which have been already described, are devoid of spines, except a series of spinules on the anterior margin of the merus and posterior margin of the dactylus of the second pair and a spinule at the distal ends of the merus-joints of all the legs; the anterior surface of the merus of the third leg is granulated. Colour (in spirit) yellowish, inclining to red in some places, as, for instance, on the gastric region of the carapace.

Adult ♀.	Lines.	Millims.
Length of carapace to base of rostrum,	15½	33
Breadth of carapace,	17	36
Length of chelipede,	18	38
Length of first ambulatory leg,	57	121
Length of second ambulatory leg,	70	148

The unique example (an adult female) was dredged north of the Admiralty Islands, lat. 1° 54′ 0″ S., long. 146° 39′ 40″ E., in 150 fathoms (Station 219).

It is one of the finest of the Brachyura dredged in the Challenger Expedition, and it is therefore very appropriately associated with the name of the late Director of the Civilian Scientific Staff of the Expedition.

Cyrtomaia, n. gen.

Carapace transverse and very convex, broadly rounded on the sides of the branchial regions; spinose; the spines of the gastric region greatly developed. Spines of rostrum short, not contiguous. Epistoma transverse. Post-abdominal segments (in the male) distinct. Eyes rather long, slender, or rather robust, with a spinule at the distal extremity. Antennæ long, the basal joint slender, in contact with the front at the distal extremity. Outer maxillipedes with the merus and ischium-joints strongly spinulose, the merus narrower than the ischium, longer than broad, and subtruncated at the distal extremity, with its antero-external angle produced, spiniferous; the next joint articulated with it at its antero-external angle; exognath slender. Chelipedes (in the male) very slender and spinulose, the palm not at all dilated, the fingers slender, nearly straight, and meeting along their inner margins when closed. Ambulatory legs very long and slender, with the joints more or less spinulose, the dactyli long, slender, and nearly straight.

This genus is distinguished from all others of the same section of the family by the remarkable convexity of the carapace, which is almost vertically deflexed at the gastric region, and the great development of its gastric spines, and by the elongated and slender spinuliferous chelipedes.

Cyrtomaia murrayi, n. sp. (Pl. III. fig. 1).

The carapace is rather broader than long, convex, with the gastric and cardiac regions much elevated, so that the gastric region is situated above rather than behind the hepatic regions; the gastric region is armed with six long spines, of which two are placed at some distance behind the eyes, three posterior to them in a transverse series, and one at the back of the gastric region; on its sides are also two or three smaller spinules, there are two spines on the cardiac region, three on each hepatic region, and three or four on each branchial region, besides some very small spinules; also two spinules on the upper margin of the orbits, and one (median) on the posterior margin of the carapace, three or four are placed in an oblique series on the pterygostomian region, and two on the sternal surface of the body, at the bases of the first four ambulatory legs. The segments of the post-abdomen, also, are spinuliferous, the second segment is transverse and very short, but broader than the following segment, the fifth and sixth longer than broad, the seventh narrowing to its distal extremity, which is subacute. The slender basal joint of the antennæ is not much elongated, and bears two spinules on its outer surface; the merus-joint of the outer maxillipedes has two longitudinal series of spinules on its outer surface and is denticulated on its inner margin, the merus-joint is also spinuliferous and has, in particular, a strong bifid spinule at its antero-external angle; the chelipedes are very slender and about two and a half times the length of the body, with the merus-joint longer than palm and fingers taken together, and, as well as the wrist and palm, armed with spinules, which are generally alternately long and short; palm about twice as long as the wrist and not more dilated than that joint, fingers about half as long as the palm and (as already stated) nearly straight, but slightly decussate at the tips. Ambulatory legs extremely long and slender, the merus and ischium-joints are armed with spinules, which are often alternately longer and shorter; a stronger spinule exists at the distal ends of the merus-joints; the dactyli of the first and second pairs are very minutely spinuliferous, the penultimate joints and dactyli of the fourth and fifth legs are devoid of spines, slightly compressed, and fringed with hairs. Colour (in spirit) light brownish-yellow.

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum, ...	8½	18
Greatest breadth of carapace, nearly	10	20·5
Length of a chelipede, about	23	49
Length of first ambulatory leg, about	41	87

The description and dimensions are taken from the smaller but more perfect specimen, the larger having lost all the legs, except a chelipede.

Two imperfect examples (adult males) were collected near the Ki Islands (Station 192), in 140 fathoms, lat. 5° 49′ 15″ S., long. 132° 14′ 15″ E.

Cyrtomaia suhmii, n. sp. (Pl. III. fig. 2).

The carapace, as in the preceding species, is broader than long, very convex, especially at the gastric region, and spinose; the spines of the rostrum are much longer than in the preceding species, straight, and divergent from the base (but broken in the unique example); the spines of the carapace are disposed as follows:—two very strong straight and extremely long spines on the gastric region on each side, (one or perhaps orginally two) spines on the cardiac, two rather long and about half a dozen smaller spinules on each branchial region; a strong postocular spine, and behind this a smaller spine on the hepatic region, also a series of very small spinules on the sides of the carapace, above the bases of the ambulatory legs; there are no præocular and supraocular spines; the sternum bears several spines and spinules on its anterior surface at the bases of the first three pairs of legs, the post-abdomen (in the male) is narrow, with the terminal segment slightly constricted at base, and rounded at its distal extremity; there are two spinules on the fourth and fifth segments, one (longer) on the sixth and two (small) on the seventh segment. The eyes are shorter and much more robust than in the preceding species, and have a small tubercle at the distal extremity; the basal antennal joint is slender, rather short, and is armed with three or four spinules (of which two long) on its outer margin and one (small) near its antero-internal angle; the second and third joints are slender, the third a little longer than the second; the flagellum very long and slender and fringed with long setæ. The ischium and merus-joints of the outer maxillipedes are (as already stated) strongly spinulose, the spinules of the merus arranged in longitudinal series, the spines of the antero-external lobe of the merus prominent; the exognath straight, and narrowing slightly toward its distal extremity; the chelipedes (in the male) are rather long and slender; the merus, carpus, and palm armed with long and slender spines, the longest of which, upon the upper surface of the joints, are somewhat curved; the palm is more than twice the length of the carpus, but shorter than the merus, the fingers rather more than half as long as the palm, straight and unarmed, acute at the tips and very minutely denticulated on their inner margins. The ambulatory legs are very imperfect; the first and second pairs were apparently more robust than the following and armed with long spines and setæ; the spines longest on the last three joints; the legs of the last two pairs are rather more slender than those of the two first pairs, and nearly devoid of spines (except a strong spine at the distal end of the upper margin of the merus-joints; the dactyli nearly straight. Colour (in spirit) yellowish-white.

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum, nearly	12	25
Greatest breadth of carapace, about	13	28
Length of a chelipede, about	28	59

The unique specimen is an adult male, and is unfortunately in very crushed and imper-

fect state; it was dredged at Station 214, in 500 fathoms, in lat. 4° 33′ 0″ N., long., 127° 6′ 0″ E., near the Tulur Islands.

It is at once distinguished from the preceding species by the great development of the gastric spines, and by the much longer rostrum and the shorter, thicker eyes, not to mention other characters.

Apocremnus, A. Milne Edwards.

Apocremnus, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 184, 1879.

The carapace is subtriangulate and shaped nearly as in *Inachus*, with strong spines upon the gastric, cardiac and branchial regions; there is a distinct supraocular spine, but no postocular spine. The epistoma is large. The post-abdomen in the male is six-jointed, the sixth and seventh joints coalescent. The eyes project laterally and are imperfectly retractile. The basal antennal joint is somewhat broader at the base than at the distal extremity, which bears a spine and is longitudinally carinated; the flagella are visible from above at the sides of the front. The merus of the outer maxillipedes is rounded and somewhat produced at the antero-external angle and slightly notched at the antero-internal angle, where it is articulated with the next joint. The chelipedes in the male are not robust, and the palm is but very slightly turgid; the dactyli have between them (when closed) an interspace at the base. The ambulatory legs are small and very slender, and the dactyli are partially retractile against the penultimate joint.

The single species, *Apocremnus septemspinosus*, A. Milne Edwards, has hitherto been recorded only from the Florida Straits (37 fathoms).

Apocremnus septemspinosus, A. Milne Edwards.

Apocremnus septemspinosus, A. Milne Edwards, *tom. cit.*, p. 185, pl. xxxv. fig. 5, 1879.

A small male obtained at the Island of Fernando Noronha, in 7 to 20 fathoms, is somewhat doubtfully referred to this species.

In nearly all particulars the detailed description of M. A. Milne Edwards applies to this specimen; the sternum, however, is less distinctly ridged, and more irregularly granulated.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, about	3½	7·5
Breadth of carapace,	3	6·5
Length of a chelipede,	5	11

Achæopsis, Stimpson.

Achæopsis, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 218, 1857.
,, Miers, Journ. Linn. Soc. Lond (Zool.), vol. xiv. p. 645, 1879.

This genus, which apparently represents the northern genus *Inachus* in the southern hemisphere, is distinguished from it merely by having the postocular as well as the præocular spine distinctly developed, and by the more or less falciform dactyli of the three posterior ambulatory legs.

Two species of the genus have been described, which both occur at the Cape of Good Hope, in shallow water, *Achæopsis spinulosus*, Stimpson, and *Achæopsis güntheri*, Miers, the latter distinguished from the type by having but a single very long perpendicular spine on the gastric region.[1]

Achæopsis spinulosus, Stimpson (Pl. I. fig. 4).

Achæopsis spinulosus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 218, 1857.

Three males were collected in Simon's Bay in 10 to 20 fathoms, and one in 5 to 18 fathoms; here also the types of the species were obtained.

In the specimens examined, the ambulatory legs, although granulated, can scarcely be described as spinuliferous, as in Stimpson's description.

The description (except measurements) which follows, and the figure are from adult dried examples in the collection of the British Museum, which are in more perfect condition than the Challenger specimens.

Carapace ovate-triangulate, moderately convex, and rounded on the sides of the branchial regions, with three spines disposed in a triangle on the gastric region, one on the cardiac, and two on each branchial region, on the dorsal surface (there are sometimes some smaller branchial spinules). There is one (or sometimes two) spinules above or in front of the eye-peduncles, and a well-developed postocular spine. The hepatic region is prominent and rounded and bears several small spinules, and there are several on the sides of the branchial regions. The rostrum is composed of two small acute lobes or spines which do not exceed in length the interocular portion of the front. The post-abdomen in both sexes is six-jointed. The eyes are of moderate size, and the cornæ have usually a small distal tubercle. The basal joint of the antennæ is slender, longitudinally sulcated, and bears several small spinules; the flagella are exposed and visible in a dorsal view at the sides of the rostrum. The merus of the exterior maxillipedes is narrower than the penultimate joint, is not distally truncated, and bears the next joint near to its antero-external angle. The chelipedes (in the adult male) are

[1] Possibly the Australian species *Stenorhynchus curvirostris*, A. Milne Edwards, and *Stenorhynchus fissifrons*, Haswell, which have not been figured, may be referable to this genus. *Stenorhynchus brevirostris*, Haswell, is, I think, a species of *Achæus*.

rather more than twice as long as the carapace; merus and carpus covered with unequal spinules, the merus with a stronger spine near its distal extremity; palm longer than the carpus, turgid, granulated or spinuliferous on the outer surface and on the upper margin near the base; dactyli nearly as long as the palm, smooth, nearly straight, with acute apices and dentated on the inner margins near the base. Ambulatory legs slender, of moderate length, with a small spine or tubercle at the distal extremity of the merus-joints; the dactyli of the fourth and fifth legs distinctly falcated. The body and limbs are pubescent. Colour light yellowish-brown.

A male,[1] preserved in spirit, in the Challenger collection presents the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, nearly	5	10
Breadth of carapace,	4	8·5
Length of a chelipede, about	9	19·5
Length of first ambulatory leg,	11	23

Inachus, Fabricius.

Inachus, Fabricius (*partim*), Entom. Syst. Suppl., p. 355, 1798.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 286, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 645, 1879.

Carapace triangulate, with the regions well defined. Rostrum very short, bilobated; no præocular spine, postocular spine large. Post-abdomen composed of six distinct segments. Eyes moderately developed. Basal antennal joint slender, and reaching the front. Outer maxillipedes with the merus-joint somewhat elongated and rounded at the distal extremity. Chelipedes with the palm more or less inflated. Ambulatory legs elongated, with the dactyli nearly straight.

The well-established species of this genus are apparently restricted to the European Seas and Western North Atlantic, and occur commonly in water of moderate depth. M. A. Milne Edwards mentions that several species were taken in the Mediterranean during the recent expedition of the "Travailleur" at 445 to 455 metres.

The following species have been described:—(1) *Inachus dorsettensis* (Pennant) = *Cancer scorpio*, Fabricius, *Inachus mauritanicus*, Lucas, and var. *latus*, Brandt; (2) *Inachus dorhynchus*, Leach; (3) *Inachus leptochirus*, Leach = *Inachus leptorhynchus*, Desmarest; (4) *Inachus thoracicus*, Roux; (5) *Inachus aguiarii*, B. Capello.[2]

[1] The figure, drawn when the author was much engaged on other work, is inadvertently taken from the adult female, which differs from the male in the rather broader carapace and less turgid chelipedes.

[2] The Australian species described by Gray as *Inachus australis*, perhaps belongs to the genus *Chlorinoides*. Ruppell's *Inachus arabicus* from the Red Sea is *Menæthium monoceros*. *Inachus tuberculatus*, Lockington, from California, does not belong to this genus, as the rostrum is entire.

Inachus leptochirus, Leach.

Inachus leptochirus, Leach, Malacostraca Podophthalmata Britanniæ, pl. xxii. B.
„ „ Bell, British Crust., p. 18, 1853.
„ „ Heller, Crust. des südlichen Europa, p. 32, pl. i. figs. 12, 13, 1863.
„ *leptorinchus*, Milne Edwards (after Desmarest), Hist. Nat. Crust., vol. i. p. 289, 1834.

A small male and two small females were dredged in 50 to 90 fathoms, near Fayal, Azores.

Adult ♂.	Lines.	Millims.
Length of carapace,	3½	7·5
Breadth of carapace, nearly	2½	6·5
Length of chelipede, nearly	4½	9
Length of first ambulatory leg,	13	27·5

Oncinopus, de Haan.

Oncinopus, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 87, pl. H., 1839.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 645, 1879.

Carapace semi-membranaceous, elongate, narrow-triangulate, and depressed. Rostrum very short, composed of two vertically compressed laminiform lobes, no præ- or postocular spines. Post-abdomen in both sexes distinctly seven-jointed. Eyes slender and projecting laterally. Antennæ with the basal joint very short and slender, and not attaining the front, the flagella exposed and visible at the sides of the rostrum; merus of the exterior maxillipedes elongated and articulated with the next at its summit.

Chelipedes in the male rather small, with the palm turgid, and the fingers having between them, when closed, an interspace at the base. Ambulatory legs slender and somewhat elongated, with the penultimate joints of the first and second pairs dilated, compressed and ciliated on the posterior margin; the dactyli in all slightly arcuated and retractile against the penultimate joints.

The described species, as I have already shown, are probably all to be regarded as synonymous with *Oncinopus aranea*, de Haan, the type of the genus, which ranges from the seas of Japan through the Malaysian Seas eastward to the New Hebrides, and in bathymetrical range, from shallow water, to a depth, as the Challenger collections show, of 825 fathoms.

Oncinopus aranea, de Haan.

Oncinopus aranea, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 100, pl. xxix. fig. 2, ♂, ♀, and pl. H, 1839.
„ „ Miers, Crust. in Report on Zoological Collections of H.M.S. "Alert," p. 190, 1884, et synonyma.

Specimens are referred to this species from the following localities:—An adult female from a bottle labelled "April, 74, 2 to 10 fathoms," and therefore obtained on the

Southern Australian coast, but without precise indication of locality; an adult but small male from the Arafura Sea (depth not stated), and an adult female dredged in the Moluccas Passage, in 825 fathoms (?), in lat. 0° 48′ 30″ S., long. 126° 58′ 30″ E. (Station 196).

In the latter (deep-water) specimen the lobes of the front are prominent and widely separated, and the penultimate joints of the ambulatory legs are rather slender, as in the one from the Arafura Sea.

The South Australian specimen has a more robust and hairy body, and the single remaining ambulatory leg (of the first or second pair) has stouter, thicker joints.

The relative dimensions of the three specimens are appended :—

Adult ♀, from South Australia (shallow water).	Lines.	Millims.
Length of carapace and rostrum,	6½	13·5
Breadth of carapace,	4½	9·5
Length of (second ?) ambulatory leg,	14	30

Adult ♂, from the Arafura Sea.	Lines.	Millims.
Length of carapace and rostrum, about	4	8·5
Breadth of carapace,	3	6·5
Length of second ambulatory leg,	11	23·5

Adult ♀, from the Moluccas Passage (825 fathoms).	Lines.	Millims.
Length of carapace and rostrum,	5	11
Breadth of carapace,	4	8·5
Length of second ambulatory leg, nearly	13	27

Eurypodius, Guérin-Méneville.

Eurypodius, Guérin-Méneville, Mém. Mus. Hist. Nat. Paris, vol. xvi. p. 345, 1828.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 283, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 646, 1879.

Carapace elongate-triangulate, moderately convex and spinose above; a distinct post-ocular but no præocular spine. Spines of the rostrum contiguous, at least in their basal half. Post-abdomen (in both sexes) distinctly seven-jointed. Eyes retractile. Antennæ exposed and visible in a dorsal view at the sides of the rostrum; the basal joints slender and attaining the front. Merus of the outer maxillipedes distally truncated and bearing the next joint at its antero-internal angle. Chelipedes in the male well developed, with the palm compressed or turgid and the fingers distally acute. Ambulatory legs considerably elongated, with the penultimate joints more or less dilated and compressed; the dactyli slightly arcuate, shorter than the penultimate joints and reflexible against their inferior margins.

The described species are of large size, and they are probably varieties of the type *Eurypodius latreillei*, which is especially abundant in the Straits of Magellan and at the

Falklands, ranges northward along the western shores of South America to Peru, and occurs also, according to Professor Bell, on the coast of Brazil. It is most abundant in shallow water, but occurs at greater depths, 30 to 70 fathoms.

I have described below a species, *Eurypodius longirostris*, from Chiloe, which must be regarded as provisionally distinct, and was obtained in much deeper water (175 fathoms).

Eurypodius latreillei, Guérin-Ménéville (Pl. IV. fig. 3).

Eurypodius latreillei, Guérin-Ménéville, Mém. Mus. Hist. Nat. Paris, vol. xvi. p. 354, pl. xiv., 1828.
„ „ Milne Edwards, Hist. Nat. Crust., vol. i. p. 284, 1834; Crust. in Cuvier, Règne Animal (ed. 3), Atlas, pl. xxxiv. *bis*, fig. 1.
„ „ Miers, Proc. Zool. Soc. Lond., p. 64, 1881, et synonyma.

Among the males in the extensive series brought home by the Challenger two very distinct varieties, if not species, may be distinguished by the form of the chelipedes. In the first (var. *α*), which is to be regarded as the typical form, as shown by Guérin-Ménéville's original figure, the palm is moderately compressed, more slender, considerably longer than broad, not turgid, and the fingers are without strong tubercles on the inner margins (see Pl. IV. fig. 3).

In the second variety (var. *β*, fig. 3*a*) the palm is shorter and much more turgid, the fingers have between them (when closed) a much larger hiatus, and the dactylus and sometimes the lower finger (pollex) is armed, on its inner margin, near the base, with a strong rounded tubercle. This form has usually, but not invariably, a more slender carapace and longer rostrum. I cannot refer it to any of the so-called "species" figured and described by authors, reference to which is made in my paper above cited, where also mention is made of a specimen of this variety presented to the British Museum by Dr. R. O. Cunningham. In the Challenger series are specimens of comparatively small size presenting this peculiarity in the form of the chelipede, *e.g.*, one from Magellan Strait, dredged in 55 fathoms (Station 313), whose principal dimensions are as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum,	8½	18
Length of rostrum, about	3	6·5
Greatest breadth of carapace, about	6½	14
Length of a chelipede, about	14½	30·5
Length of second ambulatory leg, nearly	29	61

It is, therefore, not a character peculiar to the old and large males; nevertheless, as some specimens of the typical form occur presenting some approach to this variety in the greater convexity of the palm, and as, moreover, it is impossible to say to which of

the two varieties the females in the collection are to be referred, I refrain from applying to them distinctive appelations (see figs. 3, 3*a*).

It is not necessary to repeat here what has been elsewhere noted of the variability of *Eurypodius latreillei*, and the impossibility of distinguishing the various forms described as specifically distinct by the characters usually assigned to them.

Specimens of *Eurypodius latreillei* were obtained by the Challenger at the following localities :—

Chiloe.—Off Cape Tres Montes, in 45 fathoms, lat. 46° 53′ 15″ S., long. 75° 12′ 0″ W. (Station 304), a young male (var. *α*); also at Port William, the cast shell of a young male (var. *α*), with very small and slender chelipedes.

Magellan Strait.—Station 312, Port Famine, 9 fathoms; three adult and two younger males (var. *α*) the young with longer rostral spines, which are slightly divergent at the apex, also three adult and one smaller male (var. *β*), and three females.

Station 313, lat. 52° 20′ 0″ S., long. 67° 39′ 0″ W., in 55 fathoms; three small and young males (var. *α*), one having the apices of the rostral spines rather remote one from another; three males, adult, small and young (var *β*), and seven females.

Station 314 (between Magellan Strait and Falklands), lat. 51° 35′ 0″ S., long. 65° 39′ 0″ W., in 70 fathoms; a small female.

Falkland Islands.—Station 315, lat. 51° 40′ 0″ S., long. 57° 50′ 6″ W., in 12 fathoms; an adult male (var. *β*), and seven females (one a cast shell).

Station 316, lat. 51° 32′ 0″ S., long. 58° 6′ 0″ W., in 4 fathoms; an adult male (var. *α*). Its dimensions are :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	27	57·5
Breadth of carapace, about	19	40

I may note in conclusion that the specimens collected in shallower water (4 to 15 fathoms), are generally much larger and more robust than the specimens dredged at greater depths (45 to 70 fathoms), with a much more hairy carapace and legs. An adult male, however, dredged in 55 fathoms (Station 313), resembles the shallow-water specimens in these particulars, which I am unable to regard as of specific importance.

Eurypodius longirostris, n. sp. (Pl. V. fig. 1).

This form is distinguished by the remarkably reflexed rostrum of the male, which is bent upward at an angle of nearly 45° to the front, with the spines toward their apices laterally divergent from one another.

The body and limbs are thinly pubescent, the carapace narrow in proportion to its length, with the spines disposed as commonly in specimens of *Eurypodius latreillei* of the same size and sex, *e.g.*, two upon the gastric, one upon the cardiac, one on each branchial region and one on the posterior margin, besides some smaller granules on the sides of the hepatic and branchial regions. There is a small spine on the upper margin of the orbit, besides the postocular spine. The spines of the rostrum considerably exceed half the length of the carapace, the spines are contiguous at the base, but in the distal third of their length they curve laterally and outward (as shown in the figure); there is a strong spine on the interantennulary septum. The eyes, antennæ, and maxillipedes are of the same form as in *Eurypodius latreillei*. The chelipedes have, as in young males of the typical variety (α) of that species, the palms not turgid, but compressed, the fingers acute, without teeth, and without any intramarginal hiatus when closed; the merus and carpus-joints have a few distant granules on their upper margins. The ambulatory legs are very imperfect and their dimensions cannot be given, but they were evidently slender and considerably elongated, with the penultimate joints larger than the preceding and very little dilated.

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum, about	9	19
Length of rostrum, about	5½	11
Breadth of carapace, a little over	7	15
Length of a chelipede, nearly	15½	32

The example described above (a small male) was dredged off the coast of Chiloe in 175 fathoms (a much greater depth than any recorded for the true *Eurypodius latreillei*) in lat. 50° 8′ 30″ S., long. 74° 41′ 0″ W. (Station 308). It is in a much broken condition.

An immature female, dredged at the same locality and depth, has the rostrum scarcely at all reflexed and somewhat shorter, with the spines less divaricate at the apex; the chelipedes and ambulatory legs clothed with a denser pubescence; the latter much less elongated. This specimen, although distinguished by the narrower carapace and more elongated rostrum, much more nearly resembles the typical *Eurypodius latreillei* than does the male.

Gonatorhynchus, Haswell.

Gonatorhynchus, Haswell, Cat. Australian Stalk and Sessile-eyed Crust., p. 10, 1882.

Carapace subpyriform, moderately convex, its dorsal surface without spines; no præocular spine, but distinct supraocular and postocular spines; rostrum composed of two short, acute, slightly divergent spines. Post-abdomen (in the male) distinctly seven-jointed. Eyes small and partially retractile. The basal antennal joint is about twice as

long as broad and reaches the front, and has a small tooth at its antero-internal angle; the base only of the flagellum is covered by the rostral spines.

The merus of the outer maxillipedes is produced and rounded at its antero-external angle and slightly notched at the antero-internal angle, where it is articulated with the next joint. Chelipedes (in the male) of moderate size; palm somewhat turgid, smooth; fingers distally acute and having between them, when closed, an interspace at the base. Ambulatory legs of moderate length, unarmed.

The single species is restricted in its range to the southern and eastern coasts of Australia.

Gonatorhynchus tumidus, Haswell.

Gonatorhynchus tumidus, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 437, pl. xxv. fig. 4, 1880; Cat. Australian Crust., p. 10, 1882.

An adult male, collected on the southern Australian coast in 2 to 10 fathoms, April 1874, is referred, but somewhat doubtfully, to this species.

In this example, the close curled pubescence of the carapace is so dense that the tubercles cannot be seen; the chelipedes (imperfect) are more slender than in Haswell's description and figure, the palms of the chelipedes somewhat more slender and more elongated, and the fingers less strongly dentated on their inner margins.

This species is, I think, better referred to the subfamily Inachinæ than to the Acanthonychidæ.

The Challenger specimen has the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, about	10½	22·5
Breadth of carapace, ...	9½	16

Anamathia, S. I. Smith.

Anamathia, S. I. Smith, Proc. U.S. Nat. Mus., vol. vii. p. 493, 1884.
Amathia, Roux, Crust. de la Méditerranée, pl. iii., 1828, with accompanying description.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 285, 1834; name previously used.

Carapace subtriangulate, rounded behind and armed with long spines on the dorsal surface; a præocular spine present or absent; postocular spine distinct; spines of the rostrum well developed, slender and divergent. Post-abdomen in the male (in the species I have examined) distinctly seven-jointed. Eyes small. The basal antennal joint is slender and usually armed with a tooth at its antero-external angle (which is absent in the typical species, *Anamathia rissoana*). The merus of the outer maxillipedes is truncated distally and is slightly produced at the antero-external angle; the next

joint is articulated with it at its antero-internal angle; the chelipedes (in the male) are usually small, with slender palms, but are more developed in the Oriental species described below; the ambulatory legs are slender and elongated.

Of the half-dozen species described as belonging to this genus, and which are enumerated by Professor Smith (*tom. cit.*), one, *Anamathia rissoana*, inhabits the Mediterranean and the Eastern North Atlantic region; three, *Anamathia hystrix* (Stimpson), *Anamathia modesta* (Stimpson), and *Anamathia crassa* (A. Milne Edwards), the Caribbean Sea or Florida Straits; and two, *Anamathia agassizii*, Smith, and *Anamathia tanneri*, Smith, the east coast of the United States.

The fine species described below is from the far distant Philippine Islands. The species of this genus generally inhabit deep water, though not the greatest depths at which Brachyura may occur. The Mediterranean species has been recorded from comparatively shallow water (20 fathoms); the others are found at various depths of between 80 and 400 fathoms.[1]

Anamathia pulchra, n. sp. (Pl. IV. fig. 1).

The body is everywhere clothed with very close-set, short, knobbed hairs, interspersed among which are finer, longer setæ; the limbs also are closely pubescent. The carapace is much longer than broad, subpyriform rather than subtriangulate; moderately convex and armed with long spines, disposed as follows: five disposed in two transverse series, and behind these one, longer, on the gastric region; one on each hepatic region; one on the cardiac and one on the intestinal region; also four on each branchial region, the lateral one being very long; there exists also a præocular but no postocular spine, merely the rounded lobe against which the eye folds back; the spines of the rostrum are nearly straight and divergent from their bases; both are broken, but the longer (broken) spine considerably exceeds half the length of the carapace; the epistoma is about as broad as long; the pterygostomian region is armed with an oblique row of small tubercles, the sternum is without spines or tubercles. The segments of the post-abdomen (in the male) are all of them distinct and unarmed; this part of the body has the lateral margins, between the fourth and sixth segments, slightly concave; the terminal segment is slightly longer and narrower than the penultimate segment, very little longer than broad, and distally rounded. The eyes are small, with the corneæ rounded and terminal, and are completely retractile. The basal antennal joint is moderately slender, but much more robust than the two following joints (as in *Anamathia rissoana*), it is concave on its inferior surface, and has a small spine at its antero-external angle; the next joint is somewhat longer and very slender. The outer maxillipedes are smooth on their outer surface; the

[1] This genus is incorrectly designated *Amathia* on the plate, which was drawn and lettered before I had the opportunity of consulting Professor Smith's memoir.

ischium slightly concave, the merus-joint also externally concave, distally truncated, with its antero-external angle somewhat produced and its antero-internal angle (where it is articulated with the next joint) obliquely truncated and scarcely at all emarginate. The legs are rather elongated; the chelipedes (in the male) are more than twice as long as the carapace to base of rostrum; the merus rather longer than the palm, with a few granules on its upper margin near the base and on its postero-inferior margin, and with a spine at the distal end of its upper margin; carpus short, carinated on its inner and outer and (obscurely) on its upper surface; palm smooth, slightly compressed, carinated on its superior and more obscurely on its inferior margin, which is produced and rounded at its proximal angle; the fingers are shorter than the palm and are regularly denticulated on the inner margins, toward the distal extremities, which are acute; they have between them, at the base, a vacant interspace when closed, and the dactyl has on its inner margin near the base, a strong blunt tooth; the ambulatory legs are slender and elongated, closely pubescent and without spines except a small tooth or spine at the distal ends of the merus-joints; the dactyli nearly straight. Colour (in spirit) brownish-yellow.

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum,	8½	18
Greatest breadth of carapace,	6½	13·5
Length of chelipede, nearly	18	37·5
Length of right ambulatory leg of first pair,	30½	64

The unique example (an adult male) was dredged at the Philippines in 375 fathoms, in lat. 9° 26′ 0″ N., long. 123° 45′ 0″ E. (Station 210).

This handsome species is distinguished from the type of the genus (*Anamathia rissoana*) by the distinct præocular spine, which exists also in the West Indian deep-water species, *Anamathia hystrix* (Stimpson), which, however, has but four gastric spines on the carapace (in *Anamathia rissoana* there are only three).

Lispognathus, A. Milne Edwards.

Lispognathus, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 349, 1880.

The carapace is subpyriform and moderately convex, with well-developed supraocular and postocular spines; the spines of the rostrum are straight, slender, and slightly divergent. The post-abdomen (in the male) is shaped nearly as in *Inachus*, and is six-jointed in both sexes (on account of the coalescence of the penultimate with the terminal joint). The eyes are short and retractile. The basal antennal joint is slender and attains the front, and is armed on its inferior surface with small spinules and with a longer spinule at the antero-external angle. The merus of the outer maxillipedes is somewhat elongated and rounded at the distal extremity, where it is articulated with the next joint, as in *Inachus*. As in that genus, the chelipedes (in the male) are well

developed, with somewhat turgid palms and with the fingers incurved, and acute at the apices. The ambulatory legs are slender and moderately elongated.

But two species of this genus have been described; *Lispognathus thomsoni* (Norman), whose remarkable geographical and bathymetrical distribution are referred to below, and *Lispognathus furcillatus*, A. Milne Edwards, dredged at the Island of Grenada, in 291 fathoms.

This genus is allied to *Anamathia* (among the forms with well-developed rostrum), and, in my classification of the group, must be placed in the vicinity of that genus, from which, however, it is at once distinguished by the six-jointed post-abdomen and the form of the merus of the outer maxillipedes. It is also structurally very nearly allied to *Inachus* and *Achæopsis*, but from both these types it is distinguished by the well-developed rostral spines.

Lispognathus thomsoni (Norman) (Pl. V. fig. 2).

Dorynchus thomsoni, Norman, in Wyville-Thomson's Depths of the Sea, p. 174, fig. 34, wood-cut, 1873.

Lispognathus thomsoni, A. Milne Edwards, Comptes rendus, vol. xciii. pp. 878, 932, 1881; transl. in Ann. and Mag. Nat. Hist., ser. 5, vol. ix. pp. 38, 42, 1882; Rapport sur la Faune sous-marine dans les grandes profondeurs de la Méditerranée and de l'Ocean Atlantique, in Archives des Missions Scientifiques and Littéraires, ser. 3, ix. pp. 16, 39, 1882; Recueil des Planches de l'Expedition du "Travailleur," pl. iii. (*inédites*).

Agulhas Bank, off Cape Agulhas, South Africa, 150 fathoms; lat. 35° 4′ 0″ S., long. 18° 37′ 0″ E. (Station 142); four adult females and a small male. The females are very robust.

An adult female from the Agulhas Bank has the following dimensions:—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum, nearly	7	14·5
Breadth of carapace,	4½	9·5
Length of a chelipede, nearly	9½	19·5
Length of first ambulatory leg, nearly	20	42

The male, with imperfect ambulatory leg, is much smaller, and measures as follows:—

Adult ♂,	Lines.	Millims.
Length of carapace and rostrum, nearly	4	8
Breadth of carapace,	2½	5·5
Length of a chelipede,	5	11

I can observe no distinctions of note between North Atlantic specimens of this species and the Challenger specimens from Agulhas Bank, except that the former (male) examples

are somewhat less robust, the spinules on the sides of the carapace are more distinctly developed, and the palms of the chelipedes somewhat more dilated.

There is in the Challenger collection a mutilated male example, dredged near Sydney in 410 fathoms, in lat. 34° 13′ 0″ S., long. 151° 38′ 0″ E. (Station 164B), which I cannot venture to separate specifically from this species. It is distinguished from specimens of the typical form only by having one, not two spines, on each branchial region, and by having two tubercles (of which one is extremely small) upon the ocular peduncles, the distal one situated upon the corneæ. In this specimen the rostrum is unfortunately broken, and the legs are deficient, except a chelipede and part of an ambulatory leg. Its dimensions are as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum, about	3½	7·5
Breadth of carapace, ...	3	6·5
Length of chelipede, ...	8	17

The specimen from Sydney closely approaches the nearly allied species or variety *Lispognathus furcillatus*, A. Milne Edwards, dredged by M. A. Agassiz at Grenada, in the West Indies, in 291 fathoms, in those points wherein it differs from the typical[1] *Lispognathus thomsoni*.

I may add that in the typical form of this species, there are occasionally traces of a subdistal tubercle on the cornea of the ocular peduncle, and the anterior branchial spine is often but slightly developed.

Ergasticus, A. Milne Edwards.

Ergasticus, A. Milne Edwards, Rapport sur la Faune Sous-Marine dans les grandes profondeurs de la Méditerranée and de l'Océan Atlantique, p. 17, 1882.
„ Studer, Verzeich. währ. d. Reise S. M. S. "Gazelle," ges. Crustaceen, Abhandl. k. Akad. Wissensch. Berlin, Abh. ii. p. 7, 1881.

Carapace subpyriform, moderately convex and tuberculated and spinose above, and on the lateral margins, and with several small spines on the upper and lower margins of the orbits. Spines of rostrum slender, straight and divergent from the base, where they are armed with one and two accessory spines. Post-abdomen (in *Ergasticus naresii*, ♀) six-jointed. Eyes rather small and retractile. The basal joint is spinuliferous

[1] This species is one of the very few Brachyurous Decapods inhabiting the deeper abysses of the ocean which has been already ascertained to occur commonly and abundantly over a somewhat wide area of distribution in the North Atlantic Ocean. The Rev. A. M. Norman describes it (*tom. cit.*) as very widely diffused over the "warm area" of the North Atlantic, extending continuously from the Færöes to the Straits of Gibraltar. M. A. Milne Edwards (Rapport, *loc. cit.*) found it to occur abundantly in the Gulf of Gascony, and in the numerous dredgings of the "Travailleur" off the coasts of Spain and Portugal in the years 1880–81, at depths varying from 896 to 1225 mètres, and also in the Mediterranean at 500 to 700 mètres. I have determined the Challenger specimens by actual comparison with specimens from the North Atlantic "warm area," collected during the cruise of H. M. S. "Porcupine," and presented to the British (Natural History) Museum by P. Herbert Carpenter, Esq., and named by Mr Norman.

and slender, and reaches the frontal margin; the flagellum is not covered by the rostral spines. The merus of the outer maxillipedes is distally truncated, with a rather prominent antero-external angle, and the next joint is articulated at the antero-internal angle of the merus. The chelipedes are moderately developed and spinuliferous, palm smooth, not turgid, fingers unarmed and acute, ambulatory legs moderately elongated, with the merus-joints, at least, spinuliferous; dactyli nearly straight.

But two species of the genus are known, the type *Ergasticus clouei*, A. Milne Edwards, dredged off Toulon in 445 (or 455) métres, and at the Cape Verde Islands in 38 fathoms, (Studer); and *Ergasticus naresii*, described below.

This genus is nearly allied to the following (*Echinoplax*), but the spines of the rostrum are armed only with one or two small accessory spinules near the base; the post-abdomen (in the female specimen in the Challenger collection) is six, not seven-jointed, with the ultimate and penultimate joints coalescent, and the merus-joint of the outer maxillipedes is somewhat produced and rounded at its antero-external angle.

The orbit also, on account of the spinules which surround it, is better defined than in most genera of Inachidæ, to which group *Ergasticus* must, I think, be referred on account of the slenderness of the basal antennal joint.

Ergasticus naresii, n. sp. (Pl. V. fig. 3).

The carapace is scantily clothed with fine curled setæ, and is everywhere closely and rather finely granulated, and bears several longer spines; of these three are placed in a transverse series on the front of the gastric region, and one behind them, two on the cardiac region, two on the intestinal region, close to the posterior margin, and one or two on each branchial region; the sides of the carapace and the posterior margin, also, are spinuliferous; about five spines, including the strong postocular spine, define the upper margin of the orbit (of these one is bifid or trifid), also three or four spinules define its inferior margin; the spines of the rostrum are slender, straight, and considerably less than half the length of the carapace; beneath the base of each is a small spine, besides the median spine of the interantennulary septum. The eyes are moderately robust, setigerous. The very slender basal antennal joint bears several small spinules on its inferior and outer margin; the merus and ischium-joints of the outer maxillipedes are granulated. The chelipedes (in the female) are about as long as the carapace and rostrum, very slender; the spinules of their merus-joints increase in length toward the distal extremity of the joint; carpus shorter than the palm; palm about as long as fingers, very slender, not more dilated than the carpus, and spinuliferous both on its inner and outer faces; fingers slender, smooth, very minutely denticulated along their straight inner margins and with acute apices; the ambulatory legs are granulated, spinuliferous and setose, with none of the joints compressed and

dilated; the spinules are almost entirely absent from the penultimate (as well as from the terminal) joints of the ambulatory legs of the two last pairs. Colour (in spirit) light yellowish or pinkish.

Adult ♀.	Lines.	Millims.
Length of carapace to base of rostrum, nearly	3½	8
Greatest breadth of carapace, nearly	3	7
Length of spine of rostrum, about	1	2
Length of a chelipede, about	4½	10
Length of first ambulatory leg, about	10½	22

The single specimen, although of small size, is an adult female, bearing ova. It was dredged in 150 fathoms, north of the Admiralty Islands, in lat. 1° 54′ 0″ S., long. 146° 39′ 40″ E. (Station 219).

From the type of the genus, *Ergasticus clouei*, A. Milne Edwards,[1] this species, as I learn from an unpublished figure kindly sent me by the author, is at once distinguished by the different spinulation of the carapace, and the existence of small spines on the inferior wall of the orbit; in this latter character it resembles an American type belonging to a genus apparently very closely allied to, if distinct from, *Ergasticus*, the West Indian *Trachymaia cornuta*, A. Milne Edwards,[2] which, to judge from the description and figure, is distinguishable from *Ergasticus* only by the absence of accessory spinules from the rostral spines, and by the non-spinuliferous palms of the chelipedes and first ambulatory legs.

Echinoplax, n. gen.

Carapace subpyriform, longer than broad, and covered with very numerous closely set spines and spinules; orbital margin spinose; spines of rostrum straight, acute, divergent from their bases, and bearing several (six) accessory spinules. Post-abdomen (in the female) seven-jointed. Basal antennal joint slender, spinuliferous, and in contact with the front at the distal extremity; flagellum visible from above at the sides of the rostrum. Maxillipedes of normal shape; merus truncated and not notched at the distal extremity, the antero-lateral angle not produced. Legs spinuliferous. Chelipedes (in the female) slender and feeble, with the palms not dilated. Ambulatory legs considerably elongated, with the penultimate joints not dilated; the dactyli nearly straight.

Echinoplax is distinguished from all the genera of the subfamily Inachinæ, except *Ergasticus*, with which I am acquainted, by the very numerous spinules of the carapace, the accessory spinules of the rostrum, and the spinuliferous orbital margins. It is very nearly allied to *Anamathia*, and were it not that the genera of this family are generally

[1] *Comptes rendus*, vol. xciii. p. 879, 1881.

[2] Crust. in Miss. Sci. au Méxique, pt. 5, p. 352, pl. xxxiA. fig. 2, 1880.

separated by external characters of small importance, I should have preferred to regard it as a subgenus of that genus. It is also nearly related to *Plistacantha*, Miers, but is distinguished by the rostral spines, which are widely divergent from their base. But its nearest ally is apparently the preceding genus (*Ergasticus*), from which it is only distinguished by the more numerous accessory spinules of the rostrum, the seven-jointed post-abdomen in the female, and the somewhat different form of the merus of the exterior maxillipedes.

Echinoplax moseleyi, n. sp. (Pl. IV. fig. 2).

The body and limbs are covered with very numerous, closely set, slender spinules, interspersed among which are some rather longer spines and fine hairs. The carapace is subpyriform, rather convex, longer than broad, with the depressions between the regions almost obliterated; several spines are placed upon the upper orbital margin. The spines of the rostrum are slender, strongly divergent from their bases, nearly straight, acute, and more than half as long as the carapace; they bear three or four strong spinules upon their exterior margins and inferior surface. The pterygostomian regions and the sternal surface at the base of the ambulatory legs are spinuliferous, but the epistoma is smooth except at its margins. The post-abdomen in the female is narrow, with all its segments distinct and spinulose; the spinules arranged in transverse series; the terminal segment is distally rounded. The eye-peduncles are retractile and armed with one or two spinules; two strong spinules are placed upon the interantennulary septum; the basal joints of the antennules are spinuliferous, the basal joint of the antennæ very slender, and armed with about four longer spinules, and the two following joints each with one or two smaller ones; the ischium and merus-joints and the exognath of the outer maxillipedes are spinuliferous; the ischium-joint has its antero-internal angle somewhat produced and rounded; the merus is truncated at its distal extremity, with the antero-internal angle scarcely at all emarginated.

The left chelipede (in the female) is slender, and nearly as long as the carapace and rostrum together; all the joints (except the dactyli) are spinuliferous, the spinules longest on the merus-joint, which is longer than the palm and fingers together; the wrist is short; palm very slender, not thicker than the wrist and less than twice its length; fingers naked, slightly incurved, scarcely denticulated on their inner margins and distally acute. The ambulatory legs are very long and slender, those of the first pair about three times the length of the carapace to base of rostrum; the joints all slender, the penultimate not more dilated than the others; the dactyli straight; the joints (except the dactyli) are armed with spinules and clothed with long hairs, the dactyli are hairy, but not spinuliferous. Colour (in spirit) light brownish-yellow.

Adult ♀.	Lines.	Millims.
Length of carapace to base of rostrum,	7	15
Breadth of carapace, nearly	5½	12
Length of rostral spine,	3½	7·5
Length of chelipede,	10	21
Length of first ambulatory leg, about	21	44

A single adult female was dredged at the Philippines, in 375 fathoms, in lat. 9° 26′ 0″ N., long. 123° 45′ 0″ E. (Station 210).

The right chelipede is unfortunately broken in this specimen.

Macrocheira,[1] De Haan.

Macrocheira, De Haan, Crust. in v. Siebold, Fauna Japonica, dec. 4, p. 89, 1839.
„ Miers, Journ. Linn. Soc. Lond. (Zool)., vol. xiv. p. 647, 1879.

Carapace subpyriform, and rather convex, covered with tubercles, which tend to become spiniform; a supraocular and postocular but no præocular spine. Spines of rostrum short and divergent. Post-abdomen (in both sexes) seven-jointed. Eyes retractile. The basal antennal joint is short and slender and does not nearly attain the front, which is barely reached by the next joint; the flagella are visible from above at the sides of the rostrum. The merus of the exterior maxillipedes is elongated (somewhat as in *Inachus*) and is articulated with the next joint at the middle of its distal margin, which is not truncated. The chelipedes in the adult males are very considerably elongated; the palm subcylindrical, not turgid, and often as long as the merus; fingers straight and acute, and without an intermarginal hiatus at the base. The ambulatory legs are considerably elongated, subcylindrical and unarmed, with the dactyli straight and shorter than the penultimate joints.

The unique species of the genus, *Macrocheira kämpferi*, De Haan, is, as is well known, the largest of the Brachyura, and occurs in the Seas of Japan, to a depth, as the Challenger collections show, of 345 fathoms.

Macrocheira kämpferi, De Haan.

Inachus (*Macrocheira*) *kämpferi*, De Haan, Crust. in v. Siebold, Fauna Japonica, p. 100, pls. xxv., xxvi., ♂; pls. xxvii., xxviii. ♀, 1839.

Japan, off Inosima, in 345 fathoms, lat. 35° 11′ 0″ N., long. 139° 28′ 0″ E. (Station 232).

[1] This generic name was used in 1838, by Schœnherr, as *Macrocheirus*, for a genus of Coleoptera. I am loth to alter the designation by which this species has been so long known to carcinologists, but, should it be necessary to do so, the generic name *Kämpferia*, suggested by my friend Mr. A. G. More, F.L.S., of the Museum of Science and Art, Dublin, might be conveniently adopted for it.

Two small males of this well-known species, the "giant crab" of the Japanese Seas, were obtained at this Station; the dimensions of the larger specimen are (roughly) as follows:[1]—

Adult ♂.	Inches.	Centms.
Length of carapace and rostrum, about	9	23
Width over back at the branchial regions, nearly	7	718
Length of a chelipede, rather over	11	28
Length of first ambulatory leg, rather over	20	51

The tubercles and spines of the carapace are disposed much as in the large adult males, but are somewhat more acute, especially on the sides of the branchial regions; the chelipedes are comparatively small and slender, as in De Haan's figure. In both specimens the boss or tubercle upon the fifth segment of the post-abdomen is large and prominent. Both specimens are infested with numerous examples of a pedunculated Cirripede.

Subfamily 3. ACANTHONYCHINÆ.

Acanthonychinæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 647, 1879, et synonyma.

Eyes small and immobile or partially retractile, and usually concealed beneath the prominent præocular spine. Postocular spine small or absent. Basal antennal joint usually enlarged at the base and narrowing distally; rarely so slender as in *Inachus*.

The carapace is somewhat oblong or subtriangulate, rarely elongated and narrow. Rostrum simple or bifid. Merus of the exterior maxillipedes distally truncated. The chelipedes usually have the palms compressed. The ambulatory legs are of moderate length.

Besides the new genus *Oxypleurodon*, described below; *Sphenocarcinus*, A. Milne Edwards, which in 1879 I referred to the Pericerinæ, should perhaps be placed in this group.

Huenia, De Haan.

Huenia, De Haan, Crust. in v. Siebold, Fauna Japonica, dec. 4, p. 83, 1839.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 643, 1879.

Carapace depressed, flat above and dissimilar in the two sexes; in the male it is elongate-triangulate, usually with one pair only of lateral lobes (the lateral epibranchial lobes); in the female there are, besides these lobes, which are largely developed, always an anterior pair situated upon the sides of the hepatic regions; the carapace is thus quadrilobated; there is a small præocular, but no postocular spine. Rostrum simple, acute, vertically deep and laterally compressed. Post-abdomen in the male seven-jointed;

[1] These measurements were taken with a tape over the convexities of the carapace and limbs, not, as in other species, with compasses.

in the female five-jointed, with the fourth to the sixth joints coalescent. Eyes very small and almost immobile. The basal antennal joint is somewhat enlarged and coalescent at its distal extremity with the front; beneath which the flagella are inserted and thus not visible in a dorsal view. The exterior maxillipedes are small, the merus distally truncated and bearing the next joint at its antero-internal angle. The chelipedes (in the male) are moderately developed, with the palms compressed and cristate above; the fingers sub-excavated at the apices and having between them at the base, when closed, a more or less distinct interspace. Ambulatory legs of moderate length, with the penultimate joints, at least, more or less compressed; the dactyli retractile, and shorter than the penultimate joints.

In the carapace of the males a pair of antero-lateral lobes are occasionally, but rarely, developed, and a specimen presenting this peculiarity has been figured by De Haan (*tom. cit.*, pl. xxiii. fig. 4), and a male from West Island, Torres Strait, is in the collection of the British Museum.

The typical species of the genus, the very variable *Huenia proteus*, De Haan, elsewhere noted (*tom. cit., infra*, p. 191) occurs in shallow water on the coasts of Japan and China, and ranges southward among the Philippines and to the coast of Queensland and islands adjacent. Two other nearly allied species belong to this genus; *Huenia grandidieri*, A. Milne Edwards, founded on a female type from Zanzibar, and *Huenia pacifica*, Miers, occurring at the Fiji Islands and Seychelles, in 4 to 12 fathoms.[1]

The following species, which have been referred to *Huenia*, do not, I think, belong to this genus; *Huenia simplex* and *Huenia brevirostrata*, Dana, which, as has been elsewhere shown, are to be regarded as male and female of a single species, for which I have established the genus *Simocarcinus*; and *Huenia depressa*, A. Milne Edwards, also probably a female *Simocarcinus*. *Huenia bifurcata*, Streets, may also belong to *Simocarcinus*; it is described as having the rostrum bifurcated at the tip; by this may be intended the slight notch, which, in some specimens of *Simocarcinus simplex*, is observable in a lateral view of the distal extremity.

Huenia proteus, De Haan.

Huenia proteus, De Haan, Crust. in v. Siebold, Fauna Japonica, dec. 4, p. 95, pl. xxiii. figs. 4, 5, ♂ (*elongata*), fig. 6, ♀ (*heraldica*), and pl. G, 1839.
„ Miers, Crust. in Report on Zool. Collections of H.M.S. "Alert," p. 191, 1884, et synonyma.

Two adult males and two females were collected near Cape York, Australia, in 8 fathoms, in lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E. (Station 186). The males are

[1] As I have observed in the Report on the Crustacea of H.M.S. "Alert," a sufficient series of specimens might demonstrate the identity of these forms with *Huenia proteus*. There is in the collection of the British (Natural History) Museum, a female example of *Huenia proteus* from Norfolk Island, 23 fathoms (H.M.S. "Herald"). This is, I believe, the greatest depth at which the occurrence of *Huenia* has been recorded.

intermediate between the two varieties of this sex figured by De Haan, having the rostrum slender and elongated as in the one, and the antero-lateral lobes of the carapace obsolete as in the other form. In the females, the rounded antero-lateral lobes scarcely exceed in width the obliquely truncated postero-lateral lobes of the carapace.

The largest male and female have the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	14	29·5
Breadth of carapace, including the epibranchial lobes,	8½	18
Length of chelipede,	14½	30·5
Length of first ambulatory leg,	18½	39
Adult ♀.		
Length of carapace and rostrum,	10	21·5
Breadth of carapace at the lateral epibranchial lobes,	7½	15·5
Length of chelipede,	7½	15·5
Length of first ambulatory leg,	11½	24

Another small male example (with all the legs deficient) was obtained in the Arafura Sea (depth and other particulars not stated); the dorsal surface of the carapace is flat and nearly smooth; the rostrum, in a dorsal view, short and triangulate, the antero-lateral lobes of the carapace wholly obsolete, and the postero-lateral lobes small and acute.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	5	10·5
Breadth of carapace, nearly	3	6

Menæthius, Milne Edwards.

Menæthius, Milne Edwards, Hist. Nat. Crust., vol. i. p. 338, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 649, 1879.

Carapace subpyriform, moderately convex, and tuberculated on the dorsal surface, with a large triangulate præocular spine, but no postocular spine. Rostrum simple, slender, acute, or emarginate at apex. Post-abdomen in the male seven-jointed, in the female usually five-jointed, the penultimate joint formed by the coalescence of three segments. Eyes small, mobile, but not perfectly retractile. Basal antennal joint slightly wider at the base than at the distal extremity, which is unarmed; flagellum exposed and visible from above at the side of the rostrum. Merus of the exterior maxillipedes truncated at the distal extremity and with a prominent antero-external angle, and slightly notched at the antero-internal angle, where it is articulated with the next joint. Chelipedes (in the male) well developed, with the palm slightly compressed; fingers acute, and having between them, when closed, an interspace at the base. Ambulatory legs of moderate length; the joints subcylindrical, not dilated or compressed; dactyli slightly curved and partially retractile.

As Professor A. Milne Edwards has shown, it is probable that the described species of this genus, eleven in number, are all to be regarded as synonymous with the type species, *Menæthius monoceros* (Latr.).[1]

This species is very widely distributed throughout the Oriental region, from the Red Sea and East African coast to the Fiji Islands, and has not, I believe, been recorded except from shallow water (depth not exceeding 18 fathoms).

Menæthius monoceros (Latreille), var. *angusta*, Dana.

Menæthius angustus, Dana, Amer. Journ. Sci. and Arts, ser. 2, vol. xi. p. 272, 1851; U.S. Explor. Exped., Crust., vol. xiii. p. 120, pl. iv. fig. 5, 1852.

Three small male specimens, obtained off Nukalofa, Tongatabu, in 18 fathoms, lat. 20° 58′ 0″ S., long. 175° 9′ 0″ E. (Station 172), are referred to the variety designated by Dana, *Menæthius angustus*, of this very common and variable species; they agree with his description and figure in the narrowness of the carapace and the slenderness of the elongated and slightly emarginate rostrum, although presenting some differences with regard to the number and arrangement of the tubercles of the carapace, *e.g.*, the smaller tubercles of the gastric, cardiac, and branchial regions, which are much less distinct than in his figure.

Another specimen, an adult male, obtained near Cape York, Australia, in 8 fathoms, lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E. (Station 186), is of very different form, with a broad, very uneven, tuberculated carapace, flattened triangulate supraocular spines, and short rostrum, which scarcely exceeds in length the width of the carapace at the frontal region, and nearly resembles the variety figured by Dana (*tom. cit.*, p. 122, pl. iv. fig. 7), as *Menæthius subserratus*, Adams and White. Dana's specimens were from the Fiji and Samoan Islands.

The dimensions of these specimens are as follows:—

	Lines.	Millims.
Adult ♂, from Tongatabu (the largest).		
Length of carapace, rather over	3	7
Length of rostrum, nearly	2	5
Breadth of carapace, nearly	3	5·5
Length of a chelipede, about	5	11
Length of first ambulatory leg, nearly	6	12·5
Adult ♂, from Cape York.		
Length of carapace, nearly	5	10
Length of rostrum, nearly	2	4
Breadth of carapace,	4	8·5
Length of a chelipede, about	5	11
Length of first ambulatory leg, nearly	6½	13·5

[1] Exception may, however, perhaps be made provisionally for *Menæthius tuberculatus*, Adams and White, from the Mauritius, in which the tubercles of the carapace are more developed than in any other variety known to me, and take the form of blunt spines on the branchial, cardiac and intestinal regions.

Oxypleurodon, n. gen.

Carapace subpyriform, deeply channelled above, and armed with strongly projecting lateral branchial spines. Rostrum composed of two slender, slightly divergent spines. A distinct (although small) præocular tooth. Post-abdomen (in the female) distinctly seven-jointed. Eyes mobile. Basal antennal joint little broader at the base than at its distal extremity, which is unarmed; flagella of the antennæ inserted beneath the bases of the rostral spines and scarcely visible from above. Merus-joint of the outer maxillipedes with its antero-external angle somewhat produced and rounded, its antero-internal angle slightly emarginate. Chelipedes (in the female) small, with the palm slightly compressed; fingers acute. Ambulatory legs of moderate length, with the penultimate joint not dilated; the terminal joint not denticulated on its inferior margin.

This genus must be placed in the third section of my subfamily Acanthonychinæ of the family Inachidæ, and is most nearly allied (it would appear) to the genera *Leucippe*, *Epialtus*, and *Eupleurodon* in that section; from the first-named of which it is distinguished by the divergent spines of the rostrum and the distinct præocular spine; from the second by the different form of the carapace and rostrum, and from the third by the non-dentigerous ambulatory legs.

Oxypleurodon stimpsoni, n. sp. (Pl. VI. fig. 1).

The body is rather thinly clothed with very short hairs, interspersed among which, in the dorsal sulci and on the margins of the rostrum and joints of the legs, are some longer hairs. The very wide and deep excavations, or channels, of the carapace circumscribe a longitudinal median boss or prominence on the gastric region, one (transverse) on the cardiac, and one on each branchial region, which terminates in the strong, obtuse, laterally-projecting branchial spine; the posterior margin of the carapace is also elevated and somewhat reflexed, and the upper orbital margin above the eyes is somewhat thickened and convex; there is also a prominence upon the pterygostomian region and another above the bases of the chelipedes; the spines of the rostrum are about one-half the length of the carapace, and are divergent from their bases, and acute. The eyes are small and retractile. The basal joint of the antennæ is slightly dilated at the base (on the inner margin), the two next joints are slender and of nearly equal length, the flagella very slender; the ischium of the outer maxillipedes is slightly concave on its exterior face, and its antero-internal angle is prominent and broadly rounded; the merus-joint is truncated at its distal extremity; the chelipedes (in the female) are small, their merus-joint trigonous and armed with two or three granules on the margins and at the distal extremity; the carpus has a somewhat horse-shoe-shaped carina on its outer surface; the palm is little longer than the fingers, slightly laterally compressed,

with its upper margin acute, fingers with a narrow interspace between them at the base when closed, not denticulated on the inner margins, with their apices acute; the ambulatory legs are of moderate length and thickness, with the merus and carpus-joints carinated above, propodus or penultimate joint longer than the carpus; dactyli slightly curved and terminating in a strong claw.

Colour (in spirit) pale yellowish-brown.

Adult ♀.	Lines.	Millims.
Length of carapace to base of rostrum, nearly	5	10
Length of rostral spines, about	2½	5·5
Breadth to base of branchial spines,	3½	7
Length of fourth ambulatory leg, about	5	10·5

Two adult females are in the collection, one dredged near the Ki Islands, in the Banda Sea, in lat. 5° 49′ 15″ S., long. 132° 14′ 15″ E., in 140 fathoms (Station 192), and the other at the I lippines in 375 fathoms, in lat. 9° 26′ 0″ N., long. 123° 45′ 0′ E. (Station 210). Bo are imperfect; the first mentioned (from which the dimensions are taken) having perfec rostral spines, but being without the chelipedes and several of the ambulatory legs, the other having broken rostral spines.

The size and disposition of the dorsal prominences of the carapace will be better understood by a reference to the figure than by any detailed description.

Dehaanius, MacLeay.

Dehaanius, MacLeay, Annulosa in Smith, Zool. of South Africa, p. 57, 1838.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 650, 1879.

I propose to retain this designation for the South African species which follows, which is allied to *Pugettia* in the form of the carapace, which is slightly convex and uneven above, with prominent lateral branchial as well as antero-lateral lobes, and in the seven-jointed post-abdomen of the male, but has the penultimate joint of the ambulatory legs somewhat dilated, with a penultimate lobe or tooth (as in *Acanthonyx*) against which the dactyl is retractile.

It has not been recorded, except from Natal and the Cape of Good Hope, in shallow water.

Dehaanius dentatus (Milne Edwards).

Acanthonyx dentatus, Milne Edwards, Hist. Nat. Crust., vol. i. p. 343, 1834.
? *Dehaanius acanthopus*, MacLeay, Annulosa in Smith, Zool. of South Africa, p. 58, pl. iii. fig. 3*a*, 1838.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 650, 1879.

An adult female was dredged in Simon's Bay, Cape of Good Hope, in 10 to 20 fathoms.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	7½	16
Breadth of carapace to base of lateral branchial spines,	5	10·5
Length of a chelipede, about	5½	12
Length of first ambulatory leg,	7½	16

Pugettia, Dana.

Pugettia, Dana, Amer. Journ. Sci. and Arts, ser. 2, vol. xi, p. 268, 1851.
„ U.S. Explor. Exped., Crust., vol. xiii. p. 84, 1852.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 650, 1879, and synonym.

This genus is very closely allied to *Acanthonyx*, and it may suffice to indicate the distinctive characters, which are as follows:—

The carapace is usually more convex and tuberculated than in *Acanthonyx*, and the lateral branchial lobes as well as the antero-lateral lobes are large, prominent, and acute, and separated by a concave interspace. The post-abdomen (in the male) is seven-jointed. The penultimate joints of the ambulatory legs are subcylindrical, without the prominent posterior lobe or tooth which characterises *Acanthonyx*.

Of the species of this genus, two, *Pugettia gracilis*, Dana, and *Pugettia richii*, Dana, inhabit the Californian coast, the former extending its range northward to Esquimalt Harbour, British Columbia (whence it has been recorded by Mr. Spence Bate as *Pugettia lordi*). Two species, *Pugettia quadridens* (De Haan) and *Pugettia incisa* (De Haan), inhabit the seas of Japan.

I have noted the occurrence of a female of this genus, doubtfully distinct from the Californian species (*Pugettia australis*, sp. ?) from Rio de la Plata, in 28 fathoms.

None of the above species have, I believe, been recorded from very deep water; I have, however, noted the occurrence of *Pugettia incisa* (De Haan) in the Corean Seas, at a depth of 36 fathoms.

The very distinct species described below, *Pugettia velutina*, was dredged off the Ki Islands in 140 fathoms.[1]

Pugettia incisa (De Haan).

Menæthius incisus, De Haan, Crust. in v. Siebold, Fauna Japonica, p. 98, pl. xxiv. fig. 3, ♀ (*Halmius*), and pl. G., 1839.
Pugettia incisa, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 219, 1857.
„ „ Miers, Proc. Zool. Soc. Lond., p. 23, 1879.

Two adult males were collected off Yokoska, Japan, in 10 fathoms. In these specimens the lateral (postocular) expansions of the carapace have the anterior and

[1] The genus *Peltina*, Dana, is probably synonymous with *Pugettia*; of the recorded species, one, *Pugettia scutiformis*, Dana, from Rio de Janeiro, was probably founded on an immature type; the other, *Pugettia nodulosa*, Dana, inhabits the Fiji Islands (Vanua Levu), and presents all the characters of *Pugettia*.

posterior angles somewhat produced and spiniform, wherein they exhibit some approach to the allied *Pugettia quadridens* (De Haan), also from the Japanese Seas, in which the lateral expansions of the carapace are so far excavated that their anterior and posterior angles present the appearance of distinct spiniform lobes or teeth (whence the specific name).

The largest male has the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	12½	26·5
Breadth of carapace to base of lateral branchial spines, nearly	8	16·5
Length of a chelipede,	15	32
Length of first ambulatory leg,	16	34

Pugettia velutina, n. sp. (Pl. VI. fig. 2).

The body and legs are everywhere covered with a close-set, short, felty pubescence; the carapace is subpyriform, moderately convex, its dorsal surface with several elevated rounded bosses or prominences; the spines of the rostrum are rather less than half as long as the carapace, acute and divaricate from their bases; of the dorsal tubercles or bosses, three are placed upon the gastric, one on the cardiac, two on each branchial region, and there are also three small median tubercles on the elevated posterior margin of the carapace, and two conical, acute, lateral spines on each side of the body, the anterior and smaller of which is situated upon the sides of the hepatic region and the posterior on the branchial regions; the upper orbital margin is well defined, with a small præocular tooth and narrow hiatus near the postocular lobe; on the pterygostomian region is a flattened oval tubercle or prominence, and another above the bases of the chelipedes. The basal joint of the antennæ is moderately dilated, longitudinally concave; the following joints are slender and are not concealed by the spines of the rostrum in a dorsal view; the ischium-joint of the outer maxillipedes is slightly concave longitudinally; the merus-joint small, not notched at the antero-internal angle, where the following joint is articulated with it; the chelipedes (in the female) are slender and rather longer than the carapace, the merus or arm slender and subcylindrical, with three small tubercles at the distal extremity; carpus indistinctly carinated on its outer surface, palm somewhat compressed, fingers naked, regularly serrato-denticulated on their inner margins; the ambulatory legs decrease successively in length from the first to the last, and are slender, with subcylindrical joints; the dactyli not denticulated on their inferior margins; besides the close pubescence, with which the whole animal is covered, the merus-joints of the legs bear tufts of longer hairs, placed at intervals along the anterior and posterior margins, and a few such hairs exist at the distal extremities of the two following joints and on other parts of the body. Colour (in spirit) light yellowish-brown.

Adult ♀.	Lines.	Millims.
Length of carapace to base of rostrum, about	6½	13·5
Length of rostrum, about	3	6·5
Breadth of carapace, nearly	4	10
Length of a chelipede (in the female), about	7½	16
Length of first ambulatory leg, about	12	25·5

The single specimen I have seen (an adult female) is in somewhat imperfect condition, and was dredged at Station 192, near the Ki Islands, lat. 5° 49′ 15″ S., long. 132° 14′ 15″ E., in 140 fathoms.

It is at once distinguished from all the recorded species of the genus by the closely pubescent and strongly tuberculated carapace, and longer rostral spines.

Acanthonyx, Latreille.

Acanthonyx, Latreille, Crust. in Cuvier, Règne Animal, ed. 2, vol. iv. p. 58, 1829.
„ Milne Edwards (part), Hist. Nat. Crust., vol. i. p. 342, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 650, 1879.

Carapace suboblong, rounded behind, and with the dorsal surface usually depressed, not markedly constricted behind the prominent antero-lateral angles, the lateral branchial spines small and not prominent. Præocular spine prominent, acute. Spines of the rostrum united at the base, acute and but little divergent. Post-abdomen in the male, in the species I have examined, six-jointed. Eyes small, mobile, but not completely retractile. Basal antennal joint narrowing slightly from the base to the distal extremity, which is unarmed; flagellum exposed and visible from above at the side of the rostrum. Merus of the exterior maxillipedes truncated at the distal extremity and but slightly notched at the antero-internal angle, where it is articulated with the next joint. Chelipedes (in the adult male) well developed; palm compressed, but slightly turgid in the middle, and often slightly carinated above; fingers acute, and having between them, when closed, an interspace at the base. Ambulatory legs short, with the penultimate joints more or less dilated and compressed and armed with a tooth or lobe on its inferior margin, against which the small acute dactylus closes.

The species of this genus are small and not numerous, and occur both in the Atlantic and Indo-Pacific regions in shallow water. The following is a list of them:—

Acanthonyx lunulatus, Guérin-Ménéville (=*Maia glabra*, Latreille; *Acanthonyx viridis*, Costa; *Acanthonyx brevifrons*, A. Milne Edwards). Mediterranean and Cape Verde Islands.

Acanthonyx petiverii, Milne Edwards (=*Acanthonyx emarginatus*, Milne Edwards and Lucas; *Acanthonyx debilis*, Dana, and *Acanthonyx concameratus*, Kinahan, vars. ?). West Indies to Brazil, and California to Chili; Galapagos (A. Milne Edwards).

Acanthonyx mac-leayii, Krauss. Natal; Ceylon (Coll. Brit. Mus.).
Acanthonyx quadridentatus, Krauss. Natal.
Acanthonyx simplex, Dana. Sandwich Islands.
Acanthonyx consobrinus, A. Milne Edwards. Réunion.
Acanthonyx limbatus, A. Milne Edwards. Réunion.
Acanthonyx elongatus, White (ined.) Miers. Red Sea.[1]

Acanthonyx lunulatus (Risso).

Maia lunulata, Risso, Crust. de Nice, p. 49, pl. i. fig. 4, 1816.
Acanthonyx lunulatus, Milne Edwards, Hist. Nat. Crust., vol. i. p. 342, pl. xv. figs. 6–8, 1834; Atlas in Cuvier, Règne Animal, ed. 2, pl. xxvii. fig. 2.

Of this common Mediterranean species a single small immature female was obtained at St. Vincent, Cape Verde Islands. It approaches the species or variety *Acanthonyx brevifrons*, A. Milne Edwards, in the form of the front, but there are indications of three antero-lateral teeth, and the carapace, as in *Acanthonyx lunulatus*, bears several tufts of setæ.

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum, nearly	3	6
Breadth of carapace, ...	2	4·5

Family II. Maiidæ.

Maiidæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. pp. 640, 653, 1879.

Eyes retractile within the orbits, which are distinctly defined, but often more or less incomplete below, or marked with open fissures in their superior and inferior margins. Basal antennal joint always more or less enlarged.

Subfamily 1. Maiinæ.

Maiinæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 653, 1879.

Carapace usually subtriangulate. Rostrum well developed. Chelipedes (in the male) enlarged; fingers not excavate at the distal extremity.

The following genera must be added to this subfamily:—

Sisyphus, A. Milne Edwards (if the orbits in this genus are completely closed it will be better placed in the family Periceridæ). *Chlorinoides*, Haswell; also *Scyra*, Dana, and perhaps *Rochinia*, A. Milne Edwards, formerly placed in the Periceridæ.

[1] *Acanthonyx scutellatus*, MacLeay, from the Cape of Good Hope, is perhaps a species of *Epialtus*.

In the numerous genera of this group the carapace is usually subtriangulate; the rostrum emarginate or two-spined; the orbits well defined and yet incomplete; eyes completely retractile; chelipedes with fingers acute, and ambulatory legs of moderate length.

Egeria, Leach.

Egeria, Leach, Zool. Miscell., vol. ii. p. 39, 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 290, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 654, 1879.

The carapace is subpyriform and nearly as broad as long, moderately convex and tuberculated; rostrum prominent, vertically compressed, and more or less deeply emarginate at the distal extremity. Orbits shallow and very open above, and with two wide fissures in the superior and two in the inferior margin. Epistoma transverse. Post-abdomen in the male seven-jointed, in the female five-jointed (the fourth to sixth segments coalescent). Eyes short, retractile. Merus of the exterior maxillipedes truncated at the distal extremity, the antero-external angle not produced, the antero-internal angle (where the next joint is articulated) slightly notched. Chelipedes (in the adult male) moderately elongated; palm about as long as the merus, and but slightly compressed; fingers acute, and having between them, when closed, but a small interspace at the base. Ambulatory legs slender, subcylindrical and extremely elongated, but diminishing successively in length.

Several species of the genus have been described, all of which are, however, probably to be regarded as synonymous with or varieties of *Egeria arachnoides* (Rumph), which occurs commonly in the Australian, Indian, Malaysian and Chinese Seas, in water of moderate depth (to 49 fathoms).

Egeria arachnoides (Rumph).

Cancer arachnoides, Rumph, D'Amboinische Rariteit-Kamer, pl. viii. fig. 4, 1741.
?? *Cancer longipes*, Linné, Mus. Ludovici Ulrici, p. 446, 1764; Syst. Naturæ, ed. 12, p. 1047, 1766.
Egeria arachnoides, Milne Edwards, Hist. Nat. Crust., vol. i. p. 291, 1834.
„ „ Miers, Crust. in Report on Zool. Coll. H.M.S. "Alert," p. 191, 1884.
Egeria herbstii, Milne Edwards, *tom. cit.*, p. 292, 1834.
Egeria indica, Leach, Zool. Miscell., vol. ii., pl. lxxiii., 1815.
„ „ Milne Edwards, *tom. cit.*, p. 292, 1834.
Leptopus longipes, Latreille, Milne Edwards, Atlas in Cuvier, Règne Animal, Crust., ed. 3, pl. xxxiv. fig. 1.

Specimens were dredged at the following localities—

Station 188, South of New Guinea, in 28 fathoms; lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (young female). Station 190, Arafura Sea, in 49 fathoms; lat. 8° 56′ 0″ S., long.

136° 5′ 0″ E. (adult male, having lost nearly all the legs). Station 212, Celebes Sea, 10 fathoms; lat. 6°·54′ 0″ N., long. 122° 18′ 0″ E. (adult males and females).

The males are small or imperfect. An adult female (Station 212) presents the following dimensions:—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum, nearly	11	22·5
Breadth of carapace, nearly	9	18·5
Length of a chelipede,	16½	35
Length of first ambulatory leg,	61½	130·5

The specimen dredged in the Arafura Sea (Station 190) differs slightly in its somewhat shorter and broader rostrum.

Chorilibinia, Lockington.

Chorilibinia, Lockington, Proc. Calif. Acad. Nat. Sci., vol. vii. p. 69, 1876.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 654, 1879.

The generic diagnosis of Lockington is in few words, and is as follows:—"Rostrum long, broad, and emarginate at tip as in *Libinia*, but the eyes concealed beneath it as in *Chorinus* and its allies. Præ- and postorbital teeth acute, separated above and below by an acute fissure, and together constituting the orbit. Carapace triangular."

The description which follows is taken partly from Mr. Lockington's specific description, partly from the Australian species, *Chorilibinia gracilipes*, which I have referred to this genus.

Carapace subpyriform, rounded behind, and spinose on the dorsal surface; orbit divided by a hiatus or fissure above and below, upper orbital margin prominent, the supraocular lobe terminates usually, but not invariably, in a tooth or spine. Rostrum well developed, with its spines coalescent at base, and separated and divergent in their distal half or third. Post-abdomen (in the male) in *Chorilibinia gracilipes*, seven-jointed. Eyes (in *Chorilibinia gracilipes*) small, retractile. Basal antennal joint somewhat dilated, with a spine at the extero-distal angle, and (in *Chorilibinia gracilipes*) on the outer margin at the base; merus of the exterior maxillipedes (in *Chorilibinia gracilipes*) distally truncated, and considerably produced and rounded at the antero-external angle, emarginate at the antero-internal angle, where the next joint articulates with it. Chelipedes (in the male) small, palm slender, fingers small, in contact through the greater part of their length. Ambulatory legs subcylindrical, slender, elongated, the anterior pair (or second pair in *Chorilibinia angusta*?) much the longest; dactyli nearly straight, acute.

Of the two described species of this genus, one, *Chorilibinia angusta*, Lockington, inhabits the Gulf of California (depth not stated); the other, *Chorilibinia gracilipes*, Miers,

the shores and islands of North and North Eastern Australia and New Guinea, in water (as recorded) of moderate depth (3 to 28 fathoms).

This genus is nearly allied to *Egeria*, but is distinguished by having but a single hiatus in the margins of the orbit, by the spinose carapace, and more deeply divided rostrum, &c.

Chorilibinia gracilipes, Miers.

Chorilibinia gracilipes, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. xix. p. 7, pl. iv. fig. 4, 1879; Crust. in Report on Zool. Coll. H.M.S. "Alert," p. 192, 1884.
Chlorolibinia gracilipes, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 439, 1880; Cat. Australian Crust., p. 17, 1882.

An adult male is in the collection from "Torres Strait, August 1874," and an adult female dredged at Station 188, south of New Guinea, in 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E.

If, as I think is hardly possible, this species should prove to be not merely specifically but generically distinct from the type of the genus described by Mr. Lockington from the Gulf of California,[1] Mr. Haswell's slightly different spelling of the generic name may be conveniently adopted for it.

The dimensions of the male are as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	6	12·5
Breadth of carapace,	3½	7·5
Length of a chelipede,	6	12·5
Length of first ambulatory leg,	16	34

Hyas, Leach.

Hyas, Leach, Trans. Linn. Soc. Lond., vol. xi. p. 328, 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 311, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 654, 1879.

Carapace depressed, broadly pyriform or lyrate, not spinose on the dorsal surface. Spines of the rostrum dilated, vertically compressed, acute, and nearly in contact along their inner margins. No præocular spine. The orbits are shallow and somewhat open above, with a hiatus or fissure in the upper and lower margins. The post-abdomen distinct, seven-jointed both in the male and female. The eyes are short and partially visible in a dorsal view when retracted. The basal antennal joint is not greatly dilated, and is unarmed, the next joint is slightly dilated, and the third is slender; these, with the flagellum, are visible from above at the sides of the rostrum. The merus of the exterior maxillipedes is distally truncated, with the antero-external angle rounded and

[1] *Chorilibinia angusta*, Lockington, *Proc. Calif. Acad. Nat. Sci.*, vol. vii. p. 69, 1876.

not prominent, the antero-internal angle, where the next joint articulates, scarcely emarginate. The chelipedes (in the male) are of moderate length; palm slightly compressed but not carinated; fingers nearly straight, acute, and scarcely toothed on the inner margins, with scarcely any intermarginal hiatus when closed. Ambulatory legs subcylindrical, of moderate length; dactyli nearly straight, acute.

The species are not numerous. The two which follow, *Hyas aranea* (Linné) and *Hyas coarctata*, Leach, are extensively distributed throughout the North temperate seas of the Atlantic region, occurring commonly on the more northerly European coasts at Iceland, Spitzbergen, and on the eastern coast of North America northward to Greenland, and through the Arctic Seas westward to Behrings Strait and the Sea of Ochotsk.[1]

A third species, *Hyas latifrons*, Stimpson, very doubtfully distinct from *Hyas coarctata*, has been described from Behrings Strait[2] and Alaska (Lockington); and a fourth and very distinct one, *Hyas lyrata*, Dana, from California, Pugets Sound, Oregon, "deep water" (Lockington) and Vancouver Island, and British Columbia, whence there are specimens in the collection of the British Museum.

Details are wanting as regards the bathymetrical distribution of the two last-mentioned species; *Hyas aranea* has been recorded from 60 fathoms by Professor S. I. Smith (*tom. cit.*), and the same author has recently noted the occurrence of *Hyas coarctata* at very considerable depths, *e.g.*, 373 and 906 fathoms, on the American coast.[3]

Hyas aranea (Linné).

Cancer araneus, Linné, Syst. Nat., ed. 12, p. 1044, 1766.
" " Pennant, Brit. Zool., vol. iv. p. 6, pl. ix. fig. 16, 1777.
" *bufo*, Herbst, Naturg. Krabben, &c., vol. i. p. 242, pl. xvii. fig. 95, 1782.
Hyas aranea (*us*), Leach, Malacostraca Podophthalmata Britanniæ, pl. xxiA., 1815.
" " Milne Edwards, Hist. Nat. Crust., vol. i. p. 312, 1834; Crust. in Cuvier Règne Animal, ed. 3, Atlas, pl. xxxii. fig. 2.
" " Bell, British Crustacea, p. 31, woodcut, 1853.

Station 48, South of Nova Scotia, 51 fathoms; in lat. 43° 4′ 0″ N., long. 64° 5′ 0″ W. (a small male).

This specimen has the antero-lateral angles of the carapace (postocular lobes) unusually prominent.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, ...	6	12·5
Breadth of carapace, nearly	4	8

[1] *Vide*, S. I. Smith, *Trans. Connect. Acad.*, vol. v. pt. 1, p. 43, 1879.

[2] With this species or variety, characterised by the shorter, broader, less acute rostrum, and the narrower or closed fissure of the upper orbital margin, *Hyas bufonius*, White, is identical.

[3] Report on the Decapod Crustacea of the "Albatross" dredgings on the East coast of the United States, in the *Annual Report of the Commissioner of Fish and Fisheries*, 1884, p. 347.

Hyas coarctata, Leach.

Hyas coarctata (*us*), Leach, Malacostraca Podophthalmata Britanniæ, pl. xxiB. figs. 1 (♂) 2 (♀), 1815.
„ „ Milne Edwards, Hist. Nat. Crust., vol. i. p. 312, 1834; Crust. in Cuvier, Règne Animal, ed. 3, pl. xxxii. fig. 3 (outline).
„ „ Bell, British Crustacea, p. 35, woodcut, 1853.
„ „ Hoek, Niederländ. Archiv f. Zool. Suppl., Bd. i. p. 3, pl. i. fig. 1, 1882, var.
Lissa fissirostra, Say, Journ. Acad. Nat. Sci. Philad., vol. i. p. 79, 1817.
Hyas serratus, Hailstone, Ann. and Mag. Nat. Hist., vol. viii. p. 262, woodcut, 1835.
„ *coarctata*, var. *alutacea*, Brandt, in Middendorf's Sibirische Reise, vol. ii. p. 79, 1851, var. ?
„ *bufonius*, White, List Crust. Brit. Mus., p. 6, 1847.
„ *latifrons*, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 217, 1857.

An adult but small male was collected at Station 48, south of Nova Scotia, in 51 fathoms, with the preceding species, and a smaller male at Station 49, near the same locality, in lat. 43° 3′ 0″ N., long. 63° 39′ 0″ W., in 85 fathoms.

These specimens belong to the typical form of the species.

The larger male measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, nearly	15	31·5
Breadth of carapace, ...	10	21

Herbstia, Milne Edwards.

Herbstia, Milne Edwards, Hist. Nat. Crust., vol. i. p. 301, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 654, 1879, et synonyma.

Carapace depressed, broadly pyriform, with the dorsal surface usually spinose or tuberculated; the rostrum short, more or less deeply divided by a median notch or fissure into two lobes, which are vertically compressed and dilated at the base, and distally acute. Orbits shallow, with or without a præocular spine. Post-abdomen (in the male) seven-jointed. Eyes short, and when retracted usually partially visible in a dorsal view. Antennæ with the basal joint moderately dilated and armed with a spine at the antero-external angle, and often with another on the outer margin at the base; flagellum exposed and visible from above at the sides of the rostrum. Exterior maxillipedes with the merus-joint distally truncated and not produced at the antero-external angle; the antero-internal angle, where the next joint articulates, slightly emarginate. Chelipedes (in the adult male) moderately developed, with the palm (in the typical species) considerably enlarged; fingers arcuate, strongly toothed, and having between them, when closed, a wide interspace; in others, the palm is more slender, and the fingers nearly meet along the inner margins and are very obscurely dentated.

Ambulatory legs of moderate length, with the joints subcylindrical; dactyli nearly straight, acute.

The genus may be conveniently divided into two subgenera :—

1. *Herbstia*, in which the inferior margin of the orbit is not dentated, and the merus-joints of the ambulatory legs are not spinose.
2. *Herbstiella*, Stimpson,[1] in which the inferior margin of the orbit is usually armed with a tooth or spine, and the merus-joints of the ambulatory legs have a series of small spinules.

The species of the subgenus *Herbstia* are distributed as follows :—The typical species, *Herbstia condyliata* (Herbst), is common in the Mediterranean, in 20 to 40 fathoms (Heller), and has been recorded from the Canaries by Brullé; two species, *Herbstia ovata*, Stimpson, and *Herbstia rubra*, A. Milne Edwards, occur at the Cape Verde Islands, the former, which Stimpson regarded as belonging to a distinct genus *Micropisa*,[2] in 20 fathoms; a fourth species, *Herbstia violacea*, (A. Milne Edwards), has been recorded from Cape St. Vincent, Angola, the Cape Verde Islands, Goree Island, Senegambia (9 to 15 fathoms), and West Africa, the Gaboon; a fifth, *Herbstia eryophora*, Rochebrune, from Senegambia; a sixth, *Herbstia crassipes*, A. Milne Edwards, from Australia, Bass Strait; a seventh, *Herbstia pubescens*, Stimpson, from the west coast of Mexico, Manzanillo; and an eighth, *Herbstia pyriformis*, Bell, type of his genus *Rhodia*,[3] from the Galapagos.

The species of the subgenus *Herbstiella*, except the type *Herbstia depressa*, Stimpson, found at St. Thomas, and by the Challenger Expedition off the Brazilian Coast, in 30 to 350 fathoms, are all West American; *Herbstia camptacantha*, Stimpson, occurs at Acapulco, on the west coast of Mexico; and at Cape St. Lucas, California; *Herbstia tumida*, Stimpson, at Manzanillo, and *Herbstia edwardsii* (Bell), at the Galapagos. The habitat of the insufficiently known *Herbstia parviformis* (Randall) is not particularly stated.

Herbstia rubra, A. Milne Edwards (Pl. VII. fig. 1).

Herbstia rubra, A. Milne Edwards, Rev. Mag. Zool., ser. 2, vol. xxi. p. 354, 1869.

St. Vincent, Cape Verde Islands (a small male) :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	9	11
Breadth of carapace,	3½	7·5
Length of a chelipede, nearly	5	10·5
Length of first ambulatory leg,	6½	14

[1] *Ann. Lyc. Nat. Hist. New York*, vol. x. p. 93, 1871.
[2] *Proc. Acad. Nat. Sci. Philad.*, p. 217, 1857.
[3] *Proc. Zool. Soc. Lond.*, p. 169, 1835; *Trans Zool. Soc. Lond.*, vol. ii. p. 43, 1841.

This specimen, in coloration and in nearly all structural characters, bears a most remarkable resemblance to the *Herbstia pyriformis* (Bell);[1] it differs, indeed, from the description and figure of that species only in having the gastric and branchial regions more distinctly granulated. The type of *Herbstia pyriformis* was from the far distant Galapagos Islands.

From *Herbstia rubra*, as described by A. Milne Edwards, the Challenger specimen differs in the coloration, in the absence of the anterior transverse series of gastric tubercles and of the spiniform median tubercles of the cardiac region, and in the more slender legs. I should not have suspected its identity with this species, had not Professor A. Milne Edwards himself remarked upon the near affinity of *Herbstia pyriformis* and *Herbstia rubra*,[2] and to facilitate the identification of the Challenger specimen with the type of the species, I think it useful to figure it.

The margins and merus-joints of the ambulatory legs are indistinctly granulated, and the granules are spinuliform on the first pair of legs, toward the distal extremity; hence this species establishes a transition to the subgenus *Herbstiella*.

Herbstia violacea (A. Milne Edwards).

Micropisa violacea, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. iv. p. 50, pl. xvi. figs. 3–6, 1868.

Herbstia violacea, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. viii. p. 206, 1881.

Here is referred an adult female, obtained at St. Vincent, Cape Verde Islands, with the preceding species. Its dimensions are as follows :—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum,	14	29.5
Breadth of carapace,	11	23
Length of a chelipede, rather over	12	26
Length of first ambulatory leg,	14½	30·5

This form differs from the typical species of *Herbstia* in its more slender eye-peduncles, and in the chelipedes, whose dactyli, not only in the females, but also in the males I have examined, are nearly straight, acute, and very obscurely dentated or entire on the inner margins.

Herbstia ovata (Stimpson).

Micropisa ovata, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 217, 1857.

„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. iv. p. 51, pl. xvi. figs. 1, 2, 1868.

Several specimens of both sexes and of different sizes were collected at St Vincent, Cape Verde Islands, in July 1873, with the preceding species.

[1] *Trans. Zool. Soc. Lond.*, vol. ii. p. 44, pl. ix. fig. 1, 1841.

[2] Crust. Podophthalm. in Miss. Sci. au Mexique, p. 77, 1875.

In the adult females the carapace is more convex and tuberculated than in the males.

This species is always of a very small size; an adult male in the Challenger series has the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	4½	9·5
Breadth of carapace, nearly	4	8
Length of a chelipede,	5	11
Length of first ambulatory leg, nearly	7	14·5

The chelipedes, as in *Herbstia condyliata*, have the fingers in adult males arcuated and dentated near the apex, and with a wide intermarginal hiatus when closed.

Herbstia (*Herbstiella*) *depressa*? (Stimpson) (Pl. VII. fig. 2).

? *Herbstia depressa*, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 185, 1860.
„ „ A. Milne Edwards, Crust. Miss. Sci. au Mexique, pt. 5, p. 77, 1875.
? *Herbstiella depressa*, Stimpson, *tom. cit.*, vol. x. p. 93, 1871.

Three small specimens (one male and two females) dredged off the coast of Brazil at Barra Grande, in 30 to 350 fathoms, lat. 9° 5′ 0″ to 9° 10′ 0″ S., long. 34° 50′ 0″ W. to 34° 53′ 0″ W. (Station 122), are referred very doubtfully to this species.

They agree with the description in the structure of the antennæ, maxillipedes, chelipedes, and ambulatory legs, but the rostrum is divided nearly to its base, and the gastric and cardiac regions are very slightly convex, and are granulated (more distinctly in the male than in the females).

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, nearly	4	8
Breadth of carapace,	3	6·5
Length of a chelipede,	4½	9·5
Length of first ambulatory leg,	6	12·5

I think it not improbable that a comparison of these specimens with authentic examples of Stimpson's species, which I have never seen, would demonstrate their specific distinctness.

Chlorinoides, Haswell.

Chlorinoides, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 442, 1880; Cat. Australian Stalk and Sessile-eyed Crust., p. 17, 1882.

Carapace subpyriform, moderately convex, and armed with strong spines on the dorsal surface. Spines of rostrum long and divergent. A well-developed præocular spine. Orbits deep, well defined above, and with two deep fissures in the upper margin; incomplete below. Post-abdomen in both sexes distinctly seven-jointed. Eyes, when retracted, concealed beneath the projecting superior orbital margin. Antennæ with

the basal joint moderately enlarged, and armed (in the species I have examined) with a laterally projecting spine at the antero-external angle, and sometimes with another on the outer margin at the base; the flagellum is shut off from the orbital cavity by the union of the basal joint with the front, and is partially visible from above at the sides of the rostrum. Merus of the exterior maxillipedes with the antero-external angle rounded and little produced; the antero-internal angle, where the next joint articulates, slightly emarginate. Chelipedes (in the male) moderately developed, with the wrist carinated above and on the outer surface; palm compressed and often carinated above; fingers acute, denticulated on the inner margins, with a small interspace at base when closed. Ambulatory legs slender and of moderate length, or somewhat elongated; merus-joints with one (or two) spines at the distal extremity; dactyli nearly straight.

The genus thus characterised includes not only the type, *Chlorinoides tenuirostris*, Haswell, but also certain species which have been referred to *Paramithrax*, to *Chorinus*, and to *Acanthophrys*. It may indeed almost be regarded, as I have considered it elsewhere,[1] as a subgenus of *Paramithrax*, from which it is only distinguished by the well-developed præocular spine, the laterally projecting spine at the antero-external angle of the basal antennal joint, and the spinose merus-joints of the ambulatory legs. From *Acanthophrys*, A. Milne Edwards, to which it is also very nearly related, it is apparently distinguished, if *Acanthophrys cristimanus* be regarded as the type of *Acanthophrys*, by the emarginate antero-internal angle of the merus of the exterior maxillipedes, and by the spinose merus-joints of the ambulatory legs. If, however, *Acanthophrys aculeatus* be regarded as the type, *Chlorinoides* must be regarded as synonymous with *Acanthophrys*.

The following species are apparently referable to this genus; all occurring in the Indian, Malaysian, Japanese, or Chinese Seas, and in rather shallow water (to 38 fathoms) except *Chlorinoides longispinus*, de Haan; of this species I have described a variety, *bituberculatus*, from the Providence and Amirante group, in the Mascarene sub-region (in 19 to 22 fathoms).

Chlorinoides tenuirostris, Haswell (type). Torres Strait, Darnley Island.

Chlorinoides spatulifer (*Paramithrax spatulifer*, Haswell). Port Stephens (5 fathoms).

Chlorinoides coppingeri (*Paramithrax coppingeri*, Haswell). North Australia (12 to 17 fathoms); East Australia, Moreton Bay, Bass Strait (38 fathoms); Indian Ocean (A. Milne Edwards as *Acanthophrys aculeatus*). This species is possibly a variety of *Chlorinoides longispinus*, de Haan.

? *Chlorinoides filholi* (*Acanthophrys filholi*, A. Milne Edwards). Stewart Island. (The basal antennal joint and ambulatory legs are not described in this species.)

[1] Crust. Rep. Zool. Coll. H.M.S. "Alert," p. 192, 1884.

Chlorinoides longispinus (*Maia* (*Chorinus*) *longispina*, de Haan). Japanese Seas.
Chlorinoides longispinus, var. *bituberculatus* (Miers). Amirante and Providence groups (19 to 22 fathoms).
Chlorinoides halimoides (*Paramithrax halimoides* (White *ined.*) Miers). Oriental Seas.
Chlorinoides acanthonotus (*Chorinus acanthonotus*, Adams and White). Borneo.
Chlorinoides aculeatus (*Chorinus aculeatus*, Milne Edwards). Seas of Asia.
Chlorinoides aculeatus, var. *armatus* (Miers). North and North East Australia (3 to 11 fathoms).

Chlorinoides coppingeri (Haswell) (Pl. VII. fig. 3).

Paramithrax coppingeri, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 443, pl. xxvi. fig. 1, 1880 ; Cat. Australian Stalk and Sessile-eyed Crust., p. 15, 1882.
Paramithrax (*Chlorinoides*) *coppingeri*, Miers, Crust. Rep. Zool. Coll. H.M.S. "Alert," p. 192, 1884.
? *Acanthophrys aculeatus*, A. Milne Edwards, Ann. Soc. Entom. France, ser. 4, vol. v. p. 140, pl. iv. fig. 4, 1865.

Bass Strait, off East Moncœur Island, 38 fathoms. Station 162, lat. 39° 10′ 30″ S., long. 146° 37′ 0″ E. An adult male and female of small size.

In these specimens the transverse pair of spines of the cardiac region are confluent from their bases half way to their apices, which are divergent. The palms of the chelipedes (in the male) are smooth, slender, and not carinated ; the fingers, when closed, have between them but a very small interspace.

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum,	6½	13·5
Length of rostrum, about	3	7
Breadth of carapace, nearly	5	10
Length of a chelipede,	8½	18
Length of first ambulatory leg,	10	21

To facilitate the proper identification of this species, and to illustrate the generic characters, I have thought it useful to figure the Challenger male.

Pisa, Leach.

?? *Arctopisis*, Lamarck, Syst. Anim. sans Vert., p. 155, 1801, description inaccurate.
Pisa, Leach (subgenus?) Trans. Linn. Soc. Lond., vol. xi. p. 327, 1815.
„ Milne Edwards (part), Hist. Nat. Crust., vol. i. p. 303, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 657, 1879.
„ Brandt, Bull. Acad. Sci. Petersb., vol. xxvi. p. 410, 1880.

Carapace subpyriform or ovate-pyriform, moderately convex and armed with spines or tubercles. Præocular spine usually well developed. Spines of rostrum, long, simple

parallel, or in contact to near their extremities, which are usually divergent. Orbits small, with a lateral aspect, with a hiatus above and below (sometimes with two hiatuses in the upper margin). Post-abdomen in both sexes distinctly seven-jointed. Eyes rather small, retractile, and when retracted, concealed within the orbits. Antennæ with the basal joint considerably enlarged and usually armed with a tooth or spine at the antero-external angle, the flagellum exposed and visible in a dorsal view at the sides of the rostrum. Exterior maxillipedes with the merus-joint distally truncated, the antero-external angle considerably produced and rounded or subacute, the antero-internal angle slightly notched. Chelipedes (in the adult male) well developed, with the palms either turgid, fingers arcuate and meeting only at the distal extremity, or more slender, with the fingers nearly straight. Ambulatory legs of moderate length (the first much the longest) with the joints subcylindrical, without spines; the dactyli short and nearly straight.

In 1879[1] I proposed, in order to retain Leach's designation *Pisa* for some of the species with which it had been generally associated, to use this term as a *subgeneric* designation for those species in which the carapace is more ovate in shape and the palms of the chelipedes (in the adult male) turgid, with the fingers strongly arcuated and meeting only at the tips; but I doubt whether the characters are sufficiently constant and well defined even for this purpose. Of the described species of this genus, three, viz., *Pisa tribulus* (Linn.); *Pisa hirticornis* (Herbst) = *Pisa corallina*, Risso, *Pisa quadricornis*, Brandt, var.?; and *Pisa tetraodon* (Pennant) = *Pisa convexa*, Brandt; inhabit the Mediterranean in water of moderate depth (70 to 75 mm., *Pisa tribulus*, A. Milne Edwards). Of these species, two, *Pisa tribulus* and *Pisa tetraodon*, range northward to the English and Irish coasts, and southward to the Azores and Tenerife (50 to 90 fathoms); *Pisa tribulus* to the Cape Verde Islands, 38 fathoms (Studer). There are also specimens of *Pisa tetraodon* and *Pisa corallina* from Aden in the British Museum collection. Another species, *Pisa carinimanus*, Miers, has been described from the Canaries and Goree Island, Senegambia (9 to 15 fathoms). A species, *Pisa brevicornis*, A. Milne Edwards, occurs at Madagascar; and another, *Pisa acutifrons*, A. Milne Edwards, at Zanzibar. Three species, *Pisa antilocapra*, *Pisa prælonga*, Stimpson, and *Pisa erinacea*, A. Milne Edwards, occur in the Florida Straits or Caribbean Sea at depths of 37 to 118 fathoms (the last-mentioned species should perhaps be referred to the genus *Notolopas*).

[1] *Journ. Linn. Soc. Lond.* (Zool.), vol. xiv. p. 657, 1879.

Pisa (*Arctopsis*) *tribulus* (Linné).[1]

? *Cancer tribulus*, Linné, Syst. Nat., ed. 12, p. 1045, 1766.
„ *longirostris*, Herbst, Naturg. Krabben and Krebse, i. p. 230, pl. xvi. fig. 92, 1782; var. *nec*, Fabricius.
? *Arctopsis lanata*, Lamarck, Syst. Anim. sans Vert., p. 155, 1801.
Maia rostrata, Bosc, Hist. Nat. Crust., vol. i. p. 255, 1802; var.
„ *armata*, Latreille, Hist. Nat. Crust., vol. vi. p. 98, 1803; var.
Cancer biaculeatus, Montagu, Trans. Linn. Soc. Lond., vol. xi. p. 2, pl. i. fig. 2, 1815.
Pisa gibbsii, Leach, Trans. Linn. Soc., vol. xi. p. 327, 1815; Malacostraca Podophthalmata Britanniæ, pl. xix. figs. 1–4.
„ „ Milne Edwards, Hist. Nat. Crust., vol. i. p. 307, 1834.
„ „ Bell, Brit. Crust., p. 27, 1853.
„ „ Heller, Crust. südlich. Europa, p. 41, 1863.
„ „ Brandt, Bull. Acad. Sci. Petersb., vol. xxvi. p. 410, 1880.
„ *nodipes*, Leach, Zool. Miscell., vol. ii. p. 50, pl. lxxviii., 1815.
„ „ Brandt, *tom. cit.*, p. 412, 1880.
Inachus musivus, Otto, Nova Acta Acad. Cæs. Leop. Carol, p. 334, pl. xx. figs. 2, 3, 1828.
Pisa armata, Milne Edwards, Hist. Nat. Crust., vol. i. p. 308, 1834; Atlas des Crust. in Cuvier, Règne Animal, ed. 3, pl. xxviii. fig. 1.
„ „ Heller, Crust. südlich. Europa, p. 43, 1863; var.
„ „ Brandt, Bull. Acad. Sci. Petersb., vol. xxvi. p. 410, fig., 1880.

Tenerife, 78 fathoms (a small male); off Fayal, 50 to 90 fathoms (a male).

The larger (but still small) male from Fayal measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, ...	10½	22·5
Breadth of carapace, ...	5	10·5[1]

Hyastenus, White.

Hyastenus, White, Proc. Zool. Soc. Lond., p. 56, 1847.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xvi. p. 658, 1879, and synonyma.

Carapace subpyriform, rounded behind, moderately convex, smooth, tuberculated or spinose on the dorsal surface. Præocular spine small or obsolete, spines of rostrum long

[1] I am in great uncertainty as to the proper designation (both generic and specific) of this common species. Linnæus' description of *Cancer tribulus* well applies to it except as regards the legs, which are described as filiform, and except that he mentions two (not one) posterior tubercles on the carapace. *Arctopsis lanata* of Lamarck has been referred to this form by A. White, and Lamarck's generic name has priority over the almost universally used *Pisa* of Leach, but Lamarck's description is so brief, vague, and obviously incorrect, that I do not think myself justified in using his name in preference to one about which there is no uncertainty, and which has been generally adopted. It may, however, as noted above, perhaps be used for a subgeneric designation.

Pisa armata (Latreille) is, I think, a mere variety. The distinctive characters attributed by Milne Edwards to this form are, however, much better marked in a specimen in the British Museum collection than in Milne Edward's figure in the Atlas of the Règne Animal and Hist. Nat. des Crustacés.

straight, slender, simple and divergent from the base. Post-abdomen (in the male) distinctly seven-jointed. Eyes completely retractile within the small orbits, which have a lateral aspect and a fissure or hiatus in the upper and lower margins. Basal antennal joint moderately enlarged, with or without a spine at the antero-external angle, the flagellum usually exposed and visible at the sides of the rostrum in a dorsal view, but sometimes partially concealed. Exterior maxillipedes with the merus-joints distally truncated; the antero-external angle slightly produced and rounded, the antero-internal angle emarginate. Chelipedes in the adult male with the palms either slender or moderately enlarged; fingers, when closed, with or without a slight intermarginal hiatus. Ambulatory legs moderately elongated (the anterior pair usually much the longest), with the joints subcylindrical and unarmed; the dactyli nearly straight.

The species, most of which have been enumerated by A. Milne Edwards,[1] are rather numerous, and occur commonly in the shallower waters of the Indo-Pacific region, to which this genus is apparently restricted. They may be conveniently arranged under the following sections, which are connected by insensible gradations.

1. Carapace smooth and even above, with none or with a few long spines. Basal antennal joint usually without a spine at its antero-external angle. Chelipedes (in the male) with the palms small and slender. *Hyastenus diacanthus*, (de Haan); *Hyastenus aries* (Latreille); *Hyastenus spinosus* (A. Milne Edwards) (*Hyastenus verreauxii*, A. Milne Edwards, is probably a variety of *Hyastenus diacanthus*).
2. Carapace with the dorsal surface uneven and tuberculated, but without long spines. Basal antennal joint usually with a spine or tubercle at its antero-external angle. Chelipedes in the male with the palms sometimes enlarged. (*Hyastenus*, White; *Chorilia*, Dana; *Lahaina*, Dana; *Lepidonaxia*, Targioni Tozzetti).

(The name *Hyastenus*, which was used for the first section in my revision of the group in 1879, cannot be retained in that sense, since in the type, *Hyastenus sebæ*, White, the carapace is somewhat tuberculated.)

Species:—*Hyastenus sebæ*, White; *Hyastenus planasius*, Adams and White; *Hyastenus pleione* (Herbst); *Hyastenus oryx*, A. Milne Edwards; *Hyastenus longipes* (Dana); *Hyastenus gracilirostris*, Miers; *Hyastenus japonicus*, Miers; *Hyastenus ovatus* (Dana); *Hyastenus sinope*; *Hyastenus elegans*, described below; *Hyastenus convexus*, Miers; (this species and *Hyastenus planasius* have a nearly smooth carapace, as the species of the first section). *Pisa fascicularis*, Krauss, from Natal, may be referable here, but the orbits are shown in the figure as entire above.

[1] *Nouv. Archiv. Mus. Hist. Nat.*, vol. viii. p. 249, 1872.

As regards the distribution of the species, *Hyastenus oryx*, *Hyastenus spinosus*, and *Hyastenus ovatus* are, I believe, the only species which have as yet been recorded from the western division of the Oriental region, and *Hyastenus longipes* from its eastern limits (coast of Oregon).

Hyastenus elegans, Miers, and *Hyastenus japonicus*, Miers, are the only deep-water species as yet described; the former occurred, as mentioned below, near the Ki Islands in 140 fathoms (Station 192), the latter in the Japanese Seas, in 100 fathoms; the other species occur in the Chinese, Japanese, Indian, Malaysian, Australian, and Polynesian Seas, at depths not exceeding 50 fathoms.

Hyastenus diacanthus (de Haan).

Naxia diacantha, de Haan, Crust. in Siebold, Fauna Japonica, p. 96, pl. xxi. fig. 1, and pl. G, 1839.
Hyastenus diacanthus, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. viii. p. 250, 1872.

Arafura Sea, in 49 fathoms, lat. 8° 56′ 0″ S., long. 136° 5′ 0″ E. (Station 190), a female in soft and very imperfect condition; a small and young female dredged at the Philippines in 18 fathoms, lat. 11° 37′ 0″ N., long. 123° 31′ 0″ E. (Station 208), with *Hyastenus oryx*, also probably belongs to this species; it has short and but slightly divergent rostral spines and the lateral branchial teeth are obsolete.

Young specimens of this species bear a very close resemblance to *Hyastenus planasius*, but may apparently be distinguished by the more hairy carapace, the generally longer and more divergent rostral spines, and the absence of the well-developed spine at the antero-external angle of the basal antennal joint, which exists in *Hyastenus planasius*.

The dimensions of the small female are—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum, rather over	5	11
Breadth of carapace,	2½	5·5
Length of a chelipede,	3½	7·5
Length of first ambulatory leg,	6	12·5

The rostral spines in this example are nearly as in *Hyastenus planasius*.

Hyastenus planasius (Adams and White).

Pisa planasia, Adams and White, Crust. Zool. H.M.S. "Samarang," p. 9, pl. xi. figs. 4, 5, 1848.
Hyastenus planasius, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. viii. p. 250, 1872.

An adult male was dredged south of New Guinea in 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (Station 188).

The carapace (as in the type) is nearly devoid of hair; the rostral spines are very slightly divergent; there is a well-developed spine at the antero-external angle of the basal antennal joint.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	6	12·5
Breadth of carapace, rather over	3	7
Length of a chelipede, nearly	5	10
Length of first ambulatory leg,	8·5	18

Hyastenus oryx, A. Milne Edwards.

Hyastenus oryx, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. viii. p. 250, pl. xiv. fig. 1, 1872.
„ „ Miers, Crust. Rep. Zool. Coll. H.M.S. "Alert," pp. 195, 522, 1884.

Philippine Islands, 18 fathoms; lat. 11° 37′ 0″ N., long. 123° 31′ 0″ E. (Station 208). Two adult but small females are referred to this variable species. As is usual in smaller examples of this species, the spines of the rostrum are considerably reduced in length; they are much shorter than in A. Milne Edwards' figure, which is an excellent delineation of the adult male.

The larger female has only the following dimensions:—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum,	5½	11
Breadth of carapace, nearly	3	6

Hyastenus elegans, n. sp. (Pl. VI. fig. 3).

The body is covered with a close short pubescence, interspersed amid which are some longer hairs. The carapace is shaped nearly as in *Hyastenus oryx*, to which this species is nearly allied, and is armed with tubercles and spines which are much larger and more prominent than in *Hyastenus oryx*. The gastric region is tuberculated nearly as in *Hyastenus oryx*, three of the tubercles being disposed in a longitudinal median series; there is a prominent, conical tubercle on the cardiac region and a yet longer spine on the intestinal region; the hepatic, pterygostomian and branchial regions are tuberculated; there are about five small spines on each branchial region besides some smaller tubercles; the spines of the rostrum are very long (nearly as long as the carapace), slender, and but slightly divergent. The orbits, antennæ, and outer maxillipedes are nearly as in *Hyastenus* (*Chorilia*) *oryx*; the tooth at the antero-external angle of the basal antennal joint is prominent and spiniform; the chelipedes and ambulatory legs differ in nothing from the same limbs in *Hyastenus oryx*, except that there exists a small spine at the distal

end of the merus-joints in all the legs, this being represented in *Hyastenus oryx* by a small blunt tooth.

Adult ♀.	Lines.	Millims.
Length of carapace to base of rostrum, nearly	8½	17·5
Length of rostrum,	7½	15·5
Greatest breadth of carapace, nearly	5½	11
Length of ambulatory leg of first pair,	21	44

The unique female specimen in the collection was dredged near the Ki Islands in 140 fathoms, lat. 5° 49′ 15″ S., long. 132° 14′ 15″ E. (Station 192), and although of comparatively large size, is apparently not fully adult.

As this form in so many of its characters resembles *Hyastenus oryx*, I have not thought it necessary to do more than indicate the points in which it differs from that species, of which it is possible that a sufficient series would show it to be merely a well-marked deep-water variety; I cannot, however, venture to unite it with *Hyastenus oryx* on the authority of the series at present existing in the British Museum collections.

Naxia, Milne Edwards.

Naxia, Milne Edwards, Hist. Nat. Crust., vol. i. p. 313, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 658, 1879, et synonyma.

Carapace subpyriform, moderately convex, rounded behind, and armed with spines or tubercles on the dorsal surface. A præocular spine usually present, and when present well developed. Spines of the rostrum well developed, subcylindrical, parallel or divergent, and bearing on the inner margin, near to the extremities, a small accessory spine or spinule. Post-abdomen (in the male) distinctly seven-jointed (in the female some of the segments may be coalescent). Eyes small, retractile within the small orbits, which may have a single or a double hiatus in the superior margin, and a wider hiatus in the inferior margin. Antennæ with the basal joint enlarged, with a spine or tubercle at the antero-lateral angle, and sometimes with another on the exterior margin; the flagellum exposed, or partially concealed in a dorsal view by the rostral spines. Merus of the exterior maxillipedes distally truncated, with the antero-external angle little, if at all, produced, and the antero-internal angle emarginate. Chelipedes (in the male) slender and moderately developed, palm usually somewhat elongated, fingers denticulated near the distal extremity, and having between them when closed a small hiatus at the base. Ambulatory legs slender and somewhat elongated, the first pair much the longest, with the joints subcylindrical; dactyli nearly straight.

The following are, I believe, the only recorded species of this genus, which can only be distinguished from *Hyastenus* and *Pisa* by the accessory spinules of the rostrum:—

Naxia serpulifera, Milne Edwards, not uncommon on the Australian Coasts; *Naxia hirta*, A. Milne Edwards, from the East African Coast and Mascarene Islands; *Naxia robillardi*, Miers, from the Mauritius (30 fathoms); and the very distinct species described below as *Naxia hystrix*, which was dredged at Amboina in 100 fathoms.

Naxia hystrix, n. sp. (Pl. VI. fig. 4).

The body is everywhere clothed with very close set knobbed hairs, interspersed among which are longer setæ, which are most abundant upon the rostral spines; the legs, also, are rather thinly clothed with a very short pubescence, and with some longer hairs placed at wide intervals along the margins of the joints. The carapace is subpyriform, longer than broad, moderately convex, and covered with long spines, disposed as follows:—three in a transverse series, and one (median and posterior) upon the gastric region, one (long) upon the cardiac, and one long on the intestinal region, one on each hepatic region, three (besides some smaller tubercles) on each branchial region, also three small spines on each lateral margin above the bases of the ambulatory legs. There is a strong spine on the upper margin of the orbit near the front, which bears a small subbasal, posterior, accessory tubercle; behind this the upper orbital margin is widely and deeply emarginate, the notch with a median tooth or lobe; the postocular lobe is rounded, little prominent; the rostral spines are not half as long as the carapace, nearly straight, and divergent from their bases; they bear a small accessory tooth or spine on their inner margins, not far from the distal extremity; there is a spine at the antero-lateral angles of the buccal cavity, and a strong pterygostomian spine, also a strong spine on the sternum, between the bases of the chelipedes and first ambulatory legs; the segments of the post-abdomen (in the female) are spiniferous, except the small terminal segment. The eyes have short peduncles and large rounded terminal corneæ; the basal antennal joints are longer than broad, and have a strong spine or tooth on the outer margin near to the base, and another at the antero-external angle; the second and third joints are slender and visible from above at the sides of the rostral spines, the third rather longer than the second; the outer maxillipedes are without spines on their outer surface; the merus-joint is somewhat produced and rounded at its antero-external angle, and distally truncated. Chelipedes (in the female) very slender and slightly longer than the carapace and rostrum, the joints without spines, except a small spine at the distal extremity of the merus, which joint is nearly as long as the palm and fingers; the palm is not more thickened than the preceding joints, the fingers straight, acute, and closing along their inner margins. The ambulatory legs are very slender and decrease successively in length; the first pair extremely long; they are unarmed except for a small spine at the distal extremity of the merus-joints; the

dactyli are slender, elongated, and nearly straight. Colour (in spirit) light yellowish or reddish-brown.

Adult ♀.	Lines.	Millims.
Length of carapace to base of rostrum, about	7	14·5
Length of rostral spines,	2½	5·5
Greatest breadth of carapace, rather over	5	11
Length of a chelipede, nearly	10	21
Length of ambulatory leg of first pair, over	29	62

The unique example (a female nearly adult) was obtained at the Moluccas, Amboina, in 100 fathoms.

Perhaps the nearest ally to this interesting species is the *Naxia* (*Naxioides*) *robillardi*, Miers,[1] described from a specimen dredged in 30 fathoms at the Mauritius; on account of the strongly divergent rostral spines this species may be regarded as intermediate between *Naxia* and the genus *Hyastenus*.

Naxia hirta (A. Milne Edwards).

? *Naxioides hirta*, A. Milne Edwards, Ann. Soc. Entom. France, ser. 4, vol. v. p. 143, pl. iv. fig. 1, 1865.

Podopisa petersii, Hilgendorf, Monatsber. d. k. preuss. Akad. d. Wiss. Berlin, p. 785, pl. i. fig. 5, 1878.

An adult male was dredged in 15 fathoms, at Samboangan. In the disposition of the spines and tubercles of the carapace, structure of the orbits, antennæ, and legs, it very closely resembles the type of *Podopisa petersii*, as figured by Hilgendorf,[2] from Mozambique; the chelipedes are, however, somewhat more slender. The rostrum, in the adult (which in Hilgendorf's specimen was broken), is of moderate length, with the spines at first subparallel, but slightly divergent from the accessory spines, which are placed at some distance from the distal extremity; the rostral spines are themselves not much more than one-third the length of the carapace :—

Adult ♂.	Lines.	Millims.
Length of carapace,	14½	31
Length of rostrum,	5½	11·5
Breadth of carapace,	11½	24·5
Length of a chelipede,	17	36·5
Length of first ambulatory leg,	30	64

[1] *Proc. Zool. Soc. Lond.*, p. 339, pl. xx. fig. 1, 1882.

[2] Dr. F. Hilgendorf has, according to Dr. E. von Martens (Crust. in Zool. Record, 1878, p. 17), himself recognised the identity of the genus *Podopisa* with *Naxioides*, which is not to be distinguished from *Naxia*, Milne Edwards. But it is possible, I think, that Hilgendorf's species may yet prove to be distinguishable from *Naxia hirta*. In all the specimens I have examined, the carapace (as in Dr. Hilgendorf's figure), is much more tuberculated than in *Naxia hirta*, as figured by A. Milne Edwards, the rostral spines are longer, and the posterior spine of the carapace shorter than in that figure.

Scyra, Dana.

Scyra, Dana, Amer. Journ. Sci. and Arts, ser. 2, vol. xi. p. 269, 1851; Crust. in. U.S. Explor. Exped., vol. xiii. (i), p. 80, 1852.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 663, 1879.

The carapace is somewhat depressed, tuberculated, but not spinose on the dorsal surface, and with well-developed lateral epibranchial and præocular spines. The rostral spines (in the two species I have examined), are vertically compressed and laterally dilated at base, acute at the distal extremity. The orbits are small, with a lateral aspect, with a narrow hiatus or a nearly closed fissure in the upper margin, and a wider hiatus below. The post-abdomen, in the male, is distinctly seven-jointed. The eyes are very small and retractile. The basal antennal joint is moderately dilated, with a very small spine or tooth at the antero-external angle; the two following joints are slightly dilated and compressed, and these, with the flagellum, are scarcely, if at all, concealed by the spines of the rostrum. The merus of the exterior maxillipedes is distally truncated, with the antero-internal angle not produced, and the antero-internal angle notched. The chelipedes (in the adult male) are well-developed, with the palm slightly compressed and carinated above, and the fingers acute, with scarcely any basal intermarginal hiatus. The ambulatory legs are of moderate length, the joints sub-cylindrical, without spines; the first pair does not much exceed the rest in length; the dactyli are short, acute.

The examination of a larger series of specimens has shown that the fissure in the upper margin of the orbit is sometimes open, and constitutes a distinct hiatus in this genus, which will, therefore, be better placed among the Malinæ, near *Hyastenus*, than with the Pericerinæ, where I formerly classed it. In the form of the carapace, orbits, rostrum and antennæ it also presents obvious affinities with the genus *Hyas* and its allies.

Two well-marked species of this genus have been described, *Scyra acutifrons*, Dana, from the coasts of Oregon, California, British Columbia, and Vancouver Island,[1] and *Scyra compressipes*, Stimpson, from Japan (6 to 50 fathoms).

Scyra umbonata, Stimpson,[2] from the Gulf of Florida (143 fathoms), cannot be included in this genus, since it differs in the cylindrical spines of the rostrum and non-dilated mobile joints of the antennæ, and the merus of the exterior maxillipedes is not notched at the antero-internal angle. In the flattened protuberances of the carapace and in other characters this form somewhat resembles the Oriental *Oxypleurodon stimpsonii* (Miers).

[1] Specimens from the two last mentioned localities are in the collection of the British Museum.
[2] *Bull. Mus. Comp. Zoöl.*, vol. ii. p. 115, 1870,

region, from the Red Sea and Mauritius to the Fijis and New Caledonia; *Schizophrys dama* (Herbst), to which species are doubtfully referred specimens from West Australia (3 to 5 fathoms), in the collection of the British Museum, and which is apparently distinguished by the evenly granulated and narrower and more elongated carapace.[1]

Schizophrys aspera (Milne Edwards).

Mithrax asper, Milne Edwards, Hist. Nat. Crust., vol. i. p. 320, 1834.
" " Dana, Crust. in U.S. Explor. Exped., vol. xiii. p. 97, pl. ii. fig. 4, 1852.
Dione affinis, de Haan, Fauna Japonica, Crust., p. 94, pl. xxii. fig. 4 (*dichotomus*), 1839, adult ♂.
? *Mithrax quadridentatus*, MacLeay, in Smith, Annulosa Zool. South Africa, p. 58, 1849.
Mithrax spinifrons, A. Milne Edwards, Ann. Soc. Entom. France, ser. 4, vol. vii. p. 263, 1867.
Schizophrys serratus, White, Proc. Zool. Soc. Lond., p. 223, 1847, woodcut; Crust. Zool. H.M.S. "Samarang," p. 16, 1848.
Schizophrys spinifer, White, Proc. Zool. Soc. Lond., p. 223, 1847; Crust. Zool. H.M.S. "Samarang," p. 17, 1848.
Mithrax affinis, F. de B. Capello, Jorn. Sci. Math. Phys. Nat. Lisboa, p. 264, pl. iiia. fig. 4, 1871.
Schizophrys aspera, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. viii. p. 231, pl. x. figs. 1–1*f*, 1872.
" " Miers, Crust. Rep. Zool. Coll. H.M.S. "Alert" p. 197, 1884.
Mithrax (*Schizophrys*) *triangularis*, Kossmann, Crust. in Zool. Ergebnisse einer Reise in Küstengebiete des Rothen Meeres, pp. 11, 13, 1877.
" " " var. *africanus*, Kossmann, *tom. cit.*, pp. 11, 14, 1877.
" " " var. *indicus*, Kossmann, *tom. cit.*, pp. 11, 14, 1877.

An adult male was obtained in the Torres Straits, August 1874.

It belongs to what is regarded as the typical condition of this very variable species, having but a single accessory spinule on each of the corneæ of the rostrum (Crust. H.M.S. "Alert," p. 197).

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	16½	35·5
Breadth of carapace, rather over	11	23·5
Length of a chelipede,	21·5	46
Length of first ambulatory leg,	18½	39·5

This example, as the measurements show (although adult) is not of very large size. The chelipedes are not so greatly developed as in very large males, and the dactyli are much less strongly arcuated.

Subfamily 3. Micippinæ.

Micippinæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 660, 1879.

Carapace somewhat oblong-oval or sub-oblong. Rostrum vertically or nearly vertically deflexed; usually broad, lamellate. Chelipedes with the fingers acute at the

[1] Herbst suspected the habitat of his type might be American. In the small specimens in the British Museum collection the fingers are distally acute, and scarcely, if at all, excavated.

distal extremity. Basal antennal joint very much enlarged. Eye-peduncles very long, geniculated and laterally projecting.

The carapace, in the genera referred to this subfamily, is commonly somewhat constricted behind the orbits. I have already, in the memoir above cited, referred to the curious modification in the structure of the rostrum.

Pseudomicippa, Heller.

Pseudomicippe, Heller, Sitzungsb. math.-nat. Cl. k. Akad. Wiss. Wien, vol. xliii. p. 301, 1861.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 661, 1879.
? *Microhalimus*, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 435, 1880.

The carapace is elongate-pyriform, moderately convex and tuberculated on the dorsal surface, somewhat constricted at the hepatic regions; the orbits are very incomplete, with a hiatus in the upper margin, scarcely defined below; the præocular spine sometimes developed, sometimes absent; the rostral spines are divergent from, or nearly from, the base, and are horizontal or deflexed. The eyes are slender and somewhat elongated; the basal antennal joint is moderately enlarged, and has usually a small tooth at its antero-external angle; the flagellum is not concealed by the rostral spines. The merus of the exterior maxillipedes is distally truncated or slightly concave; its antero-external angle rounded, and its antero-internal angle emarginate. The chelipedes (in the male) are moderately developed; palm compressed, and fingers acute, with or without an intermarginal hiatus. The ambulatory legs are slender and moderately elongated; dactyli nearly straight, acute, and usually shorter than the penultimate joints.

The following are the described species of this genus:—

Pseudomicippe nodosa, Heller, from the Red Sea;[1] *Pseudomicippe tenuipes*, A. Milne Edwards, probably from the Indian Ocean; *Pseudomicippe varians*, Miers, rather widely distributed in the shallower waters of Australia, with which, as has elsewhere been noted, *Microhalimus deflexifrons*, Haswell, may possibly be identical.

Pseudomicippa (?) *varians*, Miers.

Pseudomicippe (?) *varians*, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. iv. p. 12, pl. iv. fig. 8, 1879; Crust. Rep. Zool. Coll. H.M.S. "Alert," p. 197, 1884.

A nearly adult female was obtained in the Torres Straits in 8 fathoms, lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E. (Station 186).

The spines of the rostrum in this specimen are very short, little more than one-fifth

[1] *Maia rösselii*, Audouin, in Savigny, Descr. de l'Egypte, Crust. Atlas, pl. vi. fig. 1, may be an earlier designation for this form, but presents certain distinctions (*cf.*, Heller, *tom. cit.*, p. 304).

the length of the carapace, and strongly deflexed; the gastric region is very distinctly tuberculated, and there is a distinct spine at the antero-external angle of the basal antennal joint.

♀.	Lines.	Millims
Length of carapace and rostrum, nearly	9½	19·5
Breadth of carapace, ...	5½	11·5

Micippa, Leach.

Micippa, Leach, Zool. Miscell., vol. iii. p. 15, 1817.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 329, 1834.
„ Miers, Journ. Linn. Soc. Lond., *tom. cit.*, p. 661, 1879; Ann. and Mag. Nat. Hist., ser. 5, vol. xv. p. 3, 1885.

Carapace nearly oblong, depressed, and rounded behind, with the dorsal surface spinose, granulated or tuberculated, and often with lateral marginal spinules or spines. Interorbital space broad; the orbits deep, with two fissures or notches in the superior and (usually) in the inferior margins, which are sometimes very incomplete. Rostrum broad, lamellate, and vertically or nearly vertically deflexed, more or less distinctly bilobated, and sometimes armed with lateral marginal spines. Eyes (in the species I have examined) moderately elongated and capable of being retracted within the orbital cavity. Antennæ with the basal joints usually very much enlarged, and sometimes armed with one or two small distal spines or tubercles; it occupies the space between the base of the rostrum and the orbit, and generally constitutes a part of the inferior wall of the orbit; the following joint is usually compressed and sometimes slightly dilated, and is not concealed by the rostrum. The merus of the exterior maxillipedes is distally truncated, with the antero-external angle more or less rounded, and the antero-internal angle emarginate. The chelipedes (in the male) are moderately developed or short; palm somewhat compressed or subcylindrical; fingers acute, meeting along the inner margins, or with a large intermarginal hiatus when closed. Ambulatory legs moderately elongated, with the joints subcylindrical, and the dactyli nearly straight, little shorter than the penultimate joints.

The species, so far as is known at present, are restricted to the shallower waters of the Indo-Pacific or Oriental region.

The following are the species referable to this genus:—

1. Rostrum with eight marginal spines:—
   Micippa cristata (Linn.). Indo-Malaysian subregion.
2. Rostrum terminating in four spines:—
   Micippa mascarenica, Kossmann. Oriental region.
   Micippa philyra (Herbst). Oriental region.

3. Rostrum terminating in two lobes which may be distally acuminated or tuberculated :—

Micippa spinosa, Stimpson. South and East Australia; New Zealand, to 38 fathoms (var. *affinis*).

Micippa curtispina, Haswell. North and North-East Australia.

4. Rostrum terminating in two long, narrow, acute lobes or spines :—

Micippa thalia (Herbst). Oriental region.

None of the species have, I believe, been recorded from deep water.

Micippa spinosa, Stimpson (Pl. VIII. fig. 2).

Micippa spinosa, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 217, 1857.
" " Haswell, Cat. Australian Crust., p. 26, 1882.
" " Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. xv. p. 8, 1885.
Paramicippa spinosa, Miers, Cat. New Zealand Crust., p. 9, 1876.
" " Crust. Rep. Zool. Coll. H.M.S. "Alert," p. 199, 1884.

South Australian coast, 2 to 10 fathoms, April, 1874 (an adult male); Port Jackson, 6 fathoms; on the Sow and Pigs Bank (an adult male and three females); Port Jackson, 8 to 15 fathoms (three females).

The adult male from 2 to 10 fathoms measures :—

Adult ♂.	Lines.	Millims.
Length of carapace and (deflexed) rostrum, rather over	9	19·5
Breadth of carapace,	7½	15·5

Micippa spinosa, var. *affinis*, Miers (Pl. VIII. fig. 3).

Paramicippa affinis, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. iv. p. 13, 1879.
Micippa spinosa, var. *affinis*, Miers, *op. cit.*, p. 9, 1885.

In this well-marked variety the carapace is suboblong, depressed, deeply concave on the hepatic regions, with the dorsal surface somewhat uneven and closely granulated; on the gastric regions are usually two somewhat larger granules, placed one behind the other and followed by one on the cardiac region; the lateral margins bear some larger tubercles which tend to become short spines; of these, three or four are on the sides of the hepatic regions, and one or two on the sides of the branchial regions; the fissures of the upper orbital margins and the postocular spine are small; the inferior margin of the orbit is deeply concave; the front is obliquely (nearly vertically) deflexed, subspatulate, with the lateral margins parallel, slightly indented at the base, the antero-lateral angles rounded, not toothed, the distal extremity with a very small triangular notch. The basal antennal joint is nearly smooth, and is without spines at its distal extremity, and

the next (mobile) joint is not dilated; the merus of the exterior maxillipedes is broadly rounded at its antero-external angle; the chelipedes (in the adult male) are moderately developed; merus and arm granulated, but without spines; palm rather short and moderately enlarged, granulated; fingers smooth, acute, and, when closed, meeting only at and near the tips; the ambulatory legs are densely hairy. An adult male has the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace to base of rostrum,	6	12·5
Breadth of carapace,	5½	11·5
Length of a chelipede, about	7	15
Length of first ambulatory leg, about	7½	16

Habitat.—Bass Strait; a female was found among the fishes of H.M.S. Challenger's collection, and two males are in the present collection from East Moncœur Island; lat. 39° 10′ 30″ S., long. 146° 37′ 0″ E. (Station 162).

This variety is distinguished by the absence of spines from the dorsal surface of the carapace and by the form of the front, which has subparallel sides, and is much less deeply notched at the distal extremity.

Family III. Periceridæ.

Periceridæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. pp. 640–662, 1879.

Eyes retractile within the small circular and well-defined orbits, which are not incomplete as in the Maiidæ. Basal antennal joint well developed, and constituting a great part of the inferior wall of the orbit; this joint is usually very considerably enlarged.

Subfamily 1. Pericerinæ.

Pericerinæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 662, 1879.

Carapace more or less subtriangulate in shape. Rostrum well developed. Second joint of antennæ not dilated. Chelipedes with the fingers acute at tips.

In this subfamily are included what may be regarded as the typical Periceridæ, in which the rostral spines are well developed and often in contact one with another. The interorbital space is usually broad, and the orbits tubular; the basal joint of the antennæ is usually much enlarged, the epistoma short, the legs of moderate length, and the fingers acute at the tips.

The following genera are to be added to this subfamily:—*Entomonyx*, Miers, *Picroceroides*, n. gen., and probably *Sisyphus*, Desbonne and Schramm.

Libinia, Leach.

Libinia, Leach, Zool. Miscell., vol. ii. p. 129, 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 298, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 662, 1879.

The carapace is convex, broadly pyriform, or nearly orbiculate, and its dorsal surface is covered with numerous tubercles, which are sometimes developed as spines; the præocular tooth or spine is usually distinct. The rostrum is well developed (sometimes rather small), emarginate or bifid at the apex, and so terminating in two teeth or spines. The orbits are small, nearly circular, and well defined, with sometimes an open fissure or hiatus in the superior and inferior margins. The post-abdomen (in the male) is distinctly seven-jointed. The eyes are small and completely retractile. The basal antennal joint is moderately enlarged, and is armed with a tooth or spine at the antero-external angle, behind which, on the exterior margin, is usually another tooth. The flagellum is not concealed by the rostrum. The merus of the exterior maxillipedes is truncated (not toothed) at the distal extremity, and its antero-internal angle is emarginate. The chelipedes (in the adult males) are well developed; palm elongated, subcylindrical or compressed, but not enlarged; fingers minutely and evenly denticulated on the inner margins, with a small intermarginal hiatus at base. The ambulatory legs are well developed, sometimes elongated, with the joints subcylindrical, unarmed; dactyli nearly straight.

This genus is closely allied on the one hand to *Doclea* and on the other to *Libidoclea*, Milne Edwards and Lucas. I have proposed elsewhere[1] to restrict the latter genus to the single species *Libidoclea granaria*, Milne Edwards and Lucas, characterised by having the merus-joint of the exterior maxillipedes armed with a strong tooth on its distal margin, a character never observed in any species either of *Libinia* or *Doclea*.

The following species are referable to the genus *Libinia* as characterised above :—

1. Fissures of the upper and lower orbital margins very narrow or closed; basal antennal joint with a tubercle or very short spine at its antero-external angle.

Libinia emarginata, Leach (=*Libinia canaliculata*, Say, and *Libinia affinis*, Randall). East Coast of United States; West Indies; West Coast of North America.

Libinia dubia, Milne Edwards (=*Libinia distincta*, Guér.-Ménév. and B. Capello; *Libinia inflata*, Streets, var. ?). East Coast of United States; West Indies; West Coast of Africa.

Libinia rhomboidea, Streets; "East Indies." (The locality is so given by Streets whose description nearly applies to *Libinia dubia*, of which this doubtful species is considered a variety by A. Milne Edwards.)

[1] *Proc. Zool. Soc. Lond.*, p. 28, 1879.

Libinia subspinosa, Streets. Chili.

Libinia rostrata, Bell. Peru.

? *Libinia setosa*, Lockington (= *Libinia semizonale*, Streets, *fide* Lockington). Lower California. (This species may belong to the other section of the genus. I have never seen Street's description of *Libinia semizonale*, which is identified with *Libinia setosa* by Lockington in a MS. note on the margin of my copy of his paper, and I am ignorant of the locality of his types.)

2. Orbits with an open fissure in the superior margin, and a wider hiatus in the inferior margin. Basal antennal joint with a well-developed spine at the antero-external angle :—

Libinia spinosa, Milne Edwards. Brazil, Patagonia, Chili (Gay).

Libinia brasiliensis, Heller (*Libidoclea*). Brazil, Rio de Janeiro.

Libinia gibbosa, A. Milne Edwards. Brazil, Desterro. (The form of the orbits and basal antennal joint is not mentioned by the author.)

Libinia coccinea, Dana (*Libidoclea*). East Coast of Patagonia (30 fathoms).

Libinia gracilipes, n. sp. Coast of Chiloe (45 fathoms).

Libinia smithii, n. sp. Coast of Chiloe (245 fathoms).[1]

Libinia smithii, n. sp. (Pl. IX. fig. 1).

The carapace is subpyriform, rather longer than broad, moderately convex, and is covered with small tubercles and with very long spines, which are disposed as follows :— Four in a longitudinal and median series, of which two are upon the gastric, one upon the cardiac, and one upon the intestinal region, close to the posterior margin of the carapace; of these four, the cardiac and intestinal spines are longest; there are also a strong præocular spine, a spine on each hepatic region, and three on each branchial region; of the branchial spines, the lateral one is extremely long, about half the length of the carapace. The small tubercles of the dorsal surface are situated mostly upon the gastric and branchial regions, and are not very numerous; there is also a series of small tubercles on the sides of the branchial regions, above the bases of the ambulatory legs, and an oblique series on the pterygostomian regions. The rostrum is about half the length of the carapace, and is composed of two slender spines, which are coalescent for about half their length, and thereafter slightly divergent. The epistoma is short, transverse. The sternum has on each side four obscure transverse ridges; the post-abdomen has all of its

[1] The *Libinia expansa*, A. Milne Edwards, 1878 (= *Doclea orientalis*, Miers, 1879) from the mouth of the Amoor River and Japanese Seas, is doubtfully referred by Milne Edwards to this genus. I have seen no males, but on account of the smallness of the basal antennal joint and other characters, I think it should be retained in *Doclea*. A. Milne Edwards has described a second species, *Libinia bidentata*, from the mouth of the Amoor, which seems to be sufficiently distinguished from *Libinia expansa* by the different tuberculation of the carapace.

segments distinct, the last triangulate. The orbits are open above and below, but the postocular lobe is broad and well developed; the eyes are short. The basal antennal joint is rather slender, and is armed with two spines, one on the outer margin and one at the distal and outer angle; the slender flagellum is visible from above at the sides of the rostrum. The ischium of the outer maxillipedes is longitudinally concave on its outer surface; the merus is distally truncated, but strongly notched at its antero-internal angle, with its antero-external angle rounded; the exognath does not quite attain the outer and distal angle of the merus, and is armed with a small tooth on its inner margin near to the distal extremity, which is subacute. The chelipedes (in the male) are rather small and feeble, scarcely exceeding the carapace and rostrum in length, with the joints unarmed; the merus is subcylindrical; the palm very slightly compressed, but not carinated, and shorter than the merus; fingers nearly as long as the palm and meeting along their inner edges, which are obscurely denticulated. The ambulatory legs are slender, with the joints unarmed, and they decrease successively in length; the first pair is more than three times the length of the carapace (without the rostrum), the fifth pair is wanting in the single specimen examined. The body and limbs are everywhere finely and closely granulated and slightly pubescent. Colour (in spirit) light yellowish-brown.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	12½	26
Breadth of carapace,	12	25
Length of rostrum,	6½	13·5
Length of a chelipede,	21	44·5
Length of first ambulatory leg,	38½	82

The unique example in the collection (an adult male) was dredged off the coast of Chiloe, in 245 fathoms, in lat. 52° 45′ 30″ S., long. 73° 46′ 0″ W. (Station 311).

This fine species is distinguished from all others of the genus with which I am acquainted by the great development of the spines of the carapace (which, including the præocular spines, are only fourteen in number) and by the greatly elongated and deeply-forked rostrum.

Libinia gracilipes, n. sp. (Pl. IX. fig. 2).

The carapace (in the adult) is moderately convex, but little longer than broad, and is covered with spines and tubercles; in the median line are five spines, of which three (small) are on the gastric region, one (longer) on the cardiac, and one (rather long) on the intestinal region; on either side of the first and second of the median gastric spines there is a tubercle; there is a spine on each hepatic region, and three or four, interspersed with numerous smaller tubercles, on each branchial region; two or three spines or

tubercles exist on the sides of the branchial regions, above the bases of the ambulatory legs, and there is an oblique series of small tubercles on each pterygostomian region. The præocular spine is well developed. The rostrum (in the adult) is about one-fourth the length of the carapace, and is cleft through half its length, with the spines slightly divergent. The orbits are widely open above and deeply fissured below; the inferior fissure rather narrower than in the preceding species. The sternum and post-abdomen are nearly as in *Libinia smithii*. The basal antennal joint, as in that species, bears two spines, one on the outer margin, and one at the antero-external angle; the outer maxillipedes also are nearly as in *Libinia smithii*. The chelipedes (in the adult) are moderately elongated, rather less than two and a half times the length of the body, with the joints closely granulated, but not tuberculated; the merus-joint is subcylindrical; the carpus has two obscure ridges on its outer surface; the palm is rather shorter than the merus, slightly compressed, but not carinated; the fingers more than half the length of the palm and denticulated on their inner margins. The ambulatory legs decrease successively in length from the first to the last, the first are more than three times the length of the carapace, the joints in all are subcylindrical and granulated, the dactyli slightly arcuated and shorter than the penultimate joints. Colour (in spirit) yellowish-brown; the carapace is rather thinly pubescent.

Adult ♂.	Lines.	Millims.
Length and breadth of carapace, about	17	36
Length of rostrum, about	5	11
Length of a chelipede,	39½	83·5
Length of first ambulatory leg,	53	112·5

An adult and two smaller males and three small females were dredged off the coast of Chiloe in 45 fathoms, in lat. 46° 53′ 15″ S., long. 75° 12′ 0″ W. (Station 304).

In the younger specimens the tubercles of the carapace are less numerous; the cardiac and intestinal spine, and one (the lateral) branchial spine are always strongly developed.

Perhaps the nearest ally to this species is *Libinia coccinea*, Dana,[1] from the East Patagonian coast, 30 fathoms, from which the Challenger species is distinguished by the much more deeply-cleft rostrum, the existence of well-developed spines on the cardiac region and posterior margin of the carapace, and the longer lateral branchial spines; characters which are constant both in the young and adult. The typical species, *Libinia granaria*, Milne Edwards and Lucas, is distinguished by the peculiar tooth of the distal margin of the merus-joint of the exterior maxillipedes.

Libinia spinosa, Milne Edwards, which has been recorded from Brazil, Patagonia, and the coast of Chili, is apparently distinguished by the much more numerous spines of the carapace and the spinose post-abdomen of the male.

[1] *Libidocea coccinea*, Dana, U.S. Explor. Exped., vol. xiii., Crust. i. p. 88, pl. i. fig. 3, 1853.

Pericera, Latreille.

Pericera, Latreille, in Cuvier, Règne Animal, ed. 2, vol. iv. p. 58, 1829.
„ Milne Edwards (pt.), Hist. Nat. Crust., vol. i. p. 334, 1834.
„ A. Milne Edwards (pt.), Crust. in Miss. Sci. au Méxique, vol. v. p. 49, 1873.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 664, 1879.

The carapace is subpyriform, rather convex, with the dorsal surface uneven, tuberculated or spinose; the lateral margins armed with a series of long spines; the præocular spine is well developed. The rostrum is composed of two well-developed spines, which are not deflexed, and are divergent from the base; the orbits are small and tubular, but do not project as in *Macrocœloma*. The post-abdomen (in the male) is distinctly seven-jointed. The eyes are small, retractile within the orbits. The basal antennal joint is very considerably enlarged, and is armed with one or two small distal spines or tubercles, which are not visible in a dorsal view; the flagellum is sometimes concealed by the rostral spines, sometimes laterally exposed at the sides of the rostrum. The merus of the exterior maxillipedes is distally truncated, with the antero-internal angle emarginate and the antero-external angle rounded or subacute. The chelipedes (in the adult male) are well developed; palm elongated and subcylindrical or somewhat compressed, but not dilated or enlarged; fingers without any or with but a small intermarginal hiatus at base when closed; ambulatory legs moderately elongated, with the joints subcylindrical, without spines; dactyli nearly straight.

The following species are referable to the genus as thus restricted:—

1. Carapace without spines on the dorsal surface:—
   Pericera cornuta (Herbst) (= *Chorinus armatus*, Randall). East Coast of United States; West Indies; Brazil; Cape Colony.
   Pericera cælata, A. Milne Edwards. Idolos Islands; Havana, to 175 fathoms (perhaps a variety of *Pericera cornuta*).
2. Carapace with dorsal spines:—
   Pericera spinosissima, Saussure. West Indies.
   Pericera ovata, Bell. Galapagos Islands.

Pericera cornuta, Milne Edwards.

Pericera cornuta, Milne Edwards, Hist. Nat. Crust., vol. i. p. 335, 1834; Atlas du Règne Animal de Cuvier, Crust., ed. 3, pl. xxx. fig. 1.
„ „ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, vol. i. p. 51, 1873.
Chorinus armatus, Randall, Journ. Acad. Nat. Sci. Philad., vol. viii. p. 108, 1839.

An adult male is in the collection, labelled as from "Simon's Bay, 10–20 faths." This example is of rather small size, as the following measurements show; it differs in

nothing from West Indian examples of the species in the collection of the British Museum.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	35½	75
Breadth of carapace, about	17½	37·5
Length of a chelipede, nearly	35	74
Length of first ambulatory leg,	34	72

Picroceroides, n. gen.

The carapace is narrow and rounded behind, it is constricted behind the orbits, which are tubular and project laterally as in *Macrocœloma;* the width at the orbits about equals the greatest width of the carapace at the branchial regions. The orbits have a long præocular and a short postocular spine, and are emarginate above and below. The rostral spines are slender, divergent, and widely separated at the base. The post-abdomen is seven-jointed in both sexes, and is transversely ridged in the male; the ridges correspond to similar elevations on the sternum, they are rounded and separated by deep depressions. The epistoma is transverse. The antennulary fossettes are small, deep and well defined; the antennæ have the basal joint (as in *Pericera* and *Macrocœloma*) very considerably enlarged, and armed on its exterior surface with a keel or crest placed immediately below the next joint, but the spine of the distal margin of this joint is obsolete and represented merely by a small tubercle; the following joints of the antennæ are slender, and the first mobile joint is partly concealed by the rostral spine. The exterior maxillipedes are small, with the merus-joints distally truncated, and with the antero-external angles rounded and the antero-internal angles emarginate. The chelipedes are moderately elongated and rather slender, with the palms slightly compressed, and more than twice as long as broad; dactyli with an intermarginal hiatus at base. The ambulatory legs are very slender and of moderate length, with the joints subcylindrical, without spines; dactyli nearly straight.

This genus is intermediate in position between *Pericera* and *Macrocœloma;* from the former it is distinguished by the absence of lateral marginal spines of the carapace and the great lateral projection of the orbits, from the latter by the form and development of the rostral and orbital spines and by the absence of the distal spines of the basal antennal joints.

It might with almost equal propriety be regarded as a subgenus of one or the other of these genera.

Picroceroides tubularis, n. sp. (Pl. X. fig. 1).

The carapace is moderately convex, much longer than broad, but little dilated at the branchial regions. The interfrontal space is concave, the gastric regions somewhat

elevated and obscurely tuberculated; the cardiac region bears a rounded prominence and the intestinal region (usually) a small spine; the cervical and branchio-cardiac sutures are continuous, and form a longitudinal sinus, separating the branchial from the gastric and cardiac regions. The tubular orbits project laterally to a remarkable degree, and each bears a very long præocular, and a small postocular spine, and has two notches in the inferior and one in the superior margin. The rostral spines (in the adult male) exceed half the length of the carapace; they are very slender, slightly curved, laterally divergent, and widely remote from one another at the base. The sternum (in the male) has three deep transverse fossæ on each side of the post-abdomen, whose segments, also, are narrow and transversely ridged. The antennulary fossettes are very small; the basal joint of the antennæ, which is very greatly dilated, and coalescent with the surrounding parts of the carapace, is without spines, but has a small nearly longitudinal crest near its distal extremity below the following joint; there is also a small tubercle on the distal margin which forms part of the wall of the tubular orbit. The ischium of the outer maxillipedes is longitudinally concave on its outer surface; the merus is distally truncated, very distinctly notched at its antero-internal angle. The chelipedes are slender and somewhat elongated (in the adult male); the merus-joint subcylindrical and unevenly granulated; carpus also granulated; palm somewhat compressed but not carinated, it is granulated on its upper margin, and more distinctly on the inner than on the outer surface, which has a slight longitudinal depression near to the upper margin; the fingers are somewhat curved and meet on their distal halves, the mobile finger has a strong tubercle on its inner margin near to the base. The ambulatory legs are extremely slender, and decrease successively in length; their dactyli are slightly arcuate.

The carapace and limbs (except the chelipedes) are rather thinly pubescent, the margins of the rostrum and of the free peduncular joints of the antennæ have some longer hairs, some of which are clavate. Colour (in spirit) yellowish-brown; tips of the fingers dark brown or black.

Adult ♂.	Lines.	Millims.
Length of carapace, about	7½	16
Breadth at branchial regions,	5	11
Length of rostral spine,	5	11
Length of chelipede,	14	30
Length of first ambulatory leg,	13½	29

Fernando Noronha (shallow water), two males and an adult female; Bahia (shallow water), an adult male and female.

Macrocœloma, Miers.

Macrocœloma, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 665, 1879.
Pericera (part) *auctorum*.

The carapace is rather convex, usually broadest at the branchial regions, with the orbits tubular and laterally projecting; the interorbital space broad; the dorsal surface unarmed or tuberculated, or with a few long spines; the margins without a series of elongated lateral spines as in *Pericera*, but often with a strongly developed lateral epibranchial spine, preceded sometimes by some smaller spines; the præocular spine or tooth is small. The spines of the rostrum are well developed. The post-abdomen in the male is distinctly seven-jointed (in the species I have examined). The eyes are usually completely retractile within the small tubular orbits. The antennæ have the basal joint considerably enlarged and armed with a spine on the distal margin, which is usually visible in a dorsal view, and sometimes with another placed immediately beneath the first (mobile) joint; the mobile part of the antenna is sometimes concealed in a dorsal view by the rostral spines, sometimes visible at their sides; the merus of the exterior maxillipedes is distally truncated, with the antero-internal angle emarginate. The palms of the chelipedes are either somewhat elongated and compressed or shorter and more dilated; fingers with or without an intermarginal hiatus. The ambulatory legs are rather short and moderately robust; dactyli slightly curved.

The following species are referable to this genus:—

1. Lateral epibranchial spines well developed:—
   Macrocœloma trispinosa (Latreille) = *Pericera nodipes*, Desbonne and Schramm. West Indies; Bermuda; Bahia.
   Macrocœloma diacantha (A. Milne Edwards). Majores (to 12 fathoms).
   Macrocœloma camptocera (Stimpson). Florida Straits.
   Macrocœloma heptacantha (Bell). Central America, Puerto Portrero.
   Macrocœloma septemspinosa (Stimpson). West of the Tortugas (to 36 fathoms); Bahia.
   Macrocœloma villosa (Bell) = *Pericera fossata*, Stimpson. California, Cape St. Lucas; Ecuador, Gulf of Guyaquil.
   Macrocœloma subparallela (Stimps.) = *Pericera vilpini*, Desbonne and Schramm. St. Thomas; Guadaloupe.
   Macrocœloma diplacantha (Stimpson). St. Thomas.
   Macrocœloma trigona (Dana). Fiji Islands.
   Macrocœloma concava, n. sp. Bahia; Fernando Noronha (7 to 20 fathoms).

2. Lateral epibranchial spines small or obsolete :—

Macrocœloma eutheca (Stimpson) (as figured by A. Milne Edwards). Tortugas; Santa Cruz, &c.; Florida Strait, 12 to 115 fathoms.

Macrocœloma lævigata (Stimpson) = *Pericera curvicorna*, Desbonne and Schramm. St. Thomas; Guadaloupe.

Macrocœloma trispinosa (Latreille).

? *Pisa trispinosa*, Latreille, Encycl. Méth. Hist. Nat., vol. x. p. 142, 1825.
Pericera trispinosa, Milne Edwards, Hist. Nat. Crust., vol. i. p. 336, 1834.
" " Guérin, Icon. des. Crust., pl. viii. fig. 3, 1829–44.
" " A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 52, pl. xv. fig. 2, 1873; et synonyma.

An adult and a smaller female is in the collection from Bermuda, and four small specimens (male and three females) from Bahia, collected in shallow water.

I have examined, in the collection of the British Museum, a considerable series of specimens of this reputedly rare species, of different ages and of both sexes. It exhibits considerable variation as regards the form and direction of the rostral spines, and the development of the prominences of the carapace. In a large adult male from the Tortugas, length of carapace and rostrum 25½ lines (54 millims.), the gastric region is very lofty and convex, and the rostral spines straight, but somewhat deflexed, sloping downward in a plane with the anterior dorsal surface of the gastric region; in smaller individuals the rostral spines are not deflexed, and vary considerably in length, being more than one-half or less than one-third the length of the carapace; generally they are parallel at the base and very slightly divergent towards the tips, but in one specimen in the Challenger series the divergence is much greater, as in *Macrocœloma diacantha* (A. Milne Edwards), and *Macrocœloma camptocera* (Stimpson), which are perhaps merely varieties of *Macrocœloma trispinosa*.

Macrocœloma septemspinosa (Stimpson).

Pericera septemspinosa, Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 113, 1870.
" " A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pp. 59, 200, pl. xv. A. fig. 2, 1873.

Bahia, shallow water, an adult female.

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum,	18½	41
Breadth of carapace, about	15½	32·5
Length of a chelipede,	16	34
Length of first ambulatory leg,	14	30

In all of its characters this species is nearly allied to *Macrocœloma heptacantha*[1] from Puerto Portrero, but it may, perhaps, be distinguished, if the figure of *Macrocœloma heptacantha* is to be trusted, by the form of the rostral spines, which in *Macrocœloma heptacantha* are straight and separated by a considerable interspace, whereas in *Macrocœloma septemspinosa* they coalesce at the base and curve laterally away from one another, so that the tips are strongly divergent. It is not a little curious that two species so nearly allied should have been described under names which are practically identical.

Macrocœloma concava, n. sp. (Pl. X. fig. 2).

Carapace longer than broad, moderately convex, and deeply concave upon the hepatic regions; its dorsal surface is armed with about ten spines and tubercles, disposed as follows; three small spines placed in a triangle upon the gastric region, of which the posterior and median one is the largest; behind the median gastric spine are two small spines on the cardiac region and one on the intestinal region close to the posterior margin; there is also a tubercle on the dorsal surface of each branchial region and a rather strong lateral spine. The lateral margins of the carapace are tuberculated, the tubercles being continued in an oblique series over the pterygostomian regions, nearly to the antero-external angle of the buccal cavity. The spines of the rostrum are short, in the adult less than one-fourth the length of the carapace, they are nearly straight, divergent, and separated by a triangulate interspace, but not widely remote at the base as in *Macrocœloma subparallela* (Stimpson). The tubular orbits are laterally much elongated, and bear small spines or tubercles, placed one in front of and one behind the eye. The very largely developed basal antennal joint about equals the base of the rostrum in width, and bears four tubercles or small spines, of which one is placed at the distal extremity, and three on the outer margin. The merus of the outer maxillipedes is somewhat produced at its antero-external angle; the exognath is rather shorter than the endognath. The chelipedes, in the male, are rather slender, but somewhat elongated, exceeding the carapace and rostrum in length; the merus-joint about equals the carpus, and is unevenly granulated and tuberculated on the margins. The carpus has a small tubercle on its inner margin; the palm is slightly compressed, but not dilated nor carinated, and is granulated on its inner surface; the fingers are about half as long as the palm, and bent downwards at an angle with it, they are curved, meeting only toward the tips, and are minutely denticulated on their inner margins; the following legs are short, decreasing successively in length, with the joints subcylindrical, the dactyli terminating in a sharp claw. The body and limbs are covered with a short close

[1] *Pericera heptacantha*, Bell, *Proc. Zool. Soc. Lond.*, p. 173, 1835; *Trans. Zool. Soc. Lond.*, vol. ii. p. 61, pl. xii. fig. 6, 1841.

pubescence and with some longer curled hairs. Colour (in spirit) yellowish-brown; tips of the fingers of the chelipedes, black.

The largest male presents the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	13	27
Length of rostrum, about	2½	5
Breadth of carapace, about	11	23
Length of a chelipede, about	18½	39
Length of first ambulatory leg,	14	30

Bahia, shallow water (an adult female), Fernandho Noronha, 7 to 20 fathoms. An adult, smaller and young male, and two small females.

The nearest ally to this species is the *Macrocœloma eutheca* (Stimpson),[1] which *Macrocœloma concava* resembles in the great development of the orbits, but in *Macrocœloma concava* the carapace at the branchial regions is much broader, the spines and tubercles of its dorsal surface more numerous, and the lateral epibranchial spine is longer. The spines of the rostrum are described by Stimpson as parallel in *Pericera eutheca*. I have observed no specimens in the Challenger series resembling *Pericera eutheca* in the characters mentioned, but it is possible a larger series would show the two species to be identical.

Microphrys, Milne Edwards.

Microphrys, Milne Edwards, Ann. d. Sci. Nat. Zool., ser. 3, vol. xvi. p. 251, 1851.
„ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, p. 59, 1875.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 664, 1879, and synonyma.

Carapace broadly subpyriform, and somewhat depressed, with the dorsal surface uneven and tuberculated, with a small lateral epibranchial spine; præocular spine sometimes not developed. Orbits small, circular, with closed fissures. Spines of rostrum slender and more or less divergent. Post-abdomen, in the male, distinctly seven-jointed (in the species examined). Eyes small. Basal antennal joint considerably dilated and armed with a long spine at the antero-external angle which is visible in a dorsal view; the mobile joints and the flagella are not concealed by the rostral spines. The merus of the exterior maxillipedes is distally truncated, with the antero-external angle somewhat produced and rounded, and the antero-internal angle emarginate. The chelipedes are moderately developed, with the palm compressed and more or less enlarged; fingers with a wide intermarginal hiatus. The ambulatory legs are rather short, with the merus and carpus joints sometimes armed with spines; the dactyli slightly curved.

[1] *Pericera eutheca*, Stimpson, *Bull. Mus. Comp. Zoöl.*, vol. ii. p. 112, 1870; A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 58, pl. xv*a*. fig. 1, 1873.

The species are confined to the American coasts and islands adjacent.

The following have been described. I am not, however, convinced of the distinctness of all of them.

Microphrys bicornutus (Latreille) = *Pisa galibica*, Desbonne and Schramm; *Pisa purpurea*, Desbonne and Schramm; *Omalacantha hirsuta*, Streets. Bermudas; coasts and Islands of the Caribbean Sea and Gulf of Mexico (to 37 fathoms); Brazil.

Microphrys weddellii, Milne Edwards. Peru; West Indies.

Microphrys aculeatus (Bell). Galapagos Islands.

Microphrys platisoma (Stimpson) = *Pisoïdes cælatus*, Lockington. California.

Microphrys tenuidus (Lockington), *Pisoides tenuidus*, Lockington. California.

Microphrys depressa (Lockington) = *Fisheria depressa*, Lockington. California.

Microphrys error, Kingsley, *Microphrys depressa*, Kingsley, *nec* Lockington. California.

Microphrys bicornutus (Latreille).

Pisa bicornuta, Latreille, Encycl. Méth. Hist. Nat., vol. x. p. 141, 1825.
Microphrys bicornutus, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. viii. p. 247, 1872; Crust. in Miss. Sci. au Méxique, p. 61, pl. xiv. figs. 2, 3, 4, 1875, et synonyma.
? *Omalacantha hirsuta*, Streets, Proc. Acad. Nat. Sci. Philad., p. 238, 1871.
„ „ A. Milne Edwards, Crust. in Miss. Sci. au. Méxique, *tom. cit.*, p. 65, 1875.

Two adults and a young male of this very variable species were obtained at Bermuda, in shallow water.

In the smaller example the carapace is relatively narrower, the tubercles of its dorsal surface less numerous and the lateral branchial spines are not developed.

The following are the dimensions of the specimens examined:

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	17	36
Breadth of carapace, about,	12	25
Length of a chelipede,	21½	45·5
Length of first ambulatory leg,	12½	26·5
Young ♂.		
Length of carapace and rostrum, about	6	13
Breadth of carapace, nearly,	4	8
Length of a chelipede,	5	10·5
Length of first ambulatory leg, about	6	13

Subfamily 2. MITHRACINÆ.[1]

Mithracinæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 666, 1879.

Carapace broadly triangulate or ovate-triangulate, sometimes transverse, with the sides slightly arcuate, interorbital space narrow. Rostrum short or obsolete. Second joint of antennæ not dilated. Chelipedes with the fingers excavated at the tips.

In this subfamily are included those Pericerida which most nearly approach the Cancridæ in the form of the carapace, the obsolescence of the rostral spines, the small and completely defined orbits, the short epistoma, and the form and development of the chelipedes and ambulatory legs.

Mithrax, Leach.

Mithrax (Leach), Latreille, in Cuvier, Règne Animal, ed. 1, p. 23, 1817.
„ Milne Edwards (part), Hist. Nat. Crust., vol. i. pp. 317, 320, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 667, 1879.

The carapace is depressed or moderately convex, sometimes longer than broad, but usually transverse and very broadly rounded at the branchial regions; dorsal surface uneven, tuberculated or spinose. The spines of the rostrum are usually very short, tuberculiform or even obsolete, but rarely well developed and acute. The orbits are small, well defined, armed with tubercles or short spines, or, rarely, entire. The epistoma is transverse, the post-abdomen in the male is distinctly seven-jointed. The eyes are small. The basal antennal joint is armed with a spine or tubercle at its distal extremity, followed usually by one or two on the exterior margin, and is very much enlarged; the following joints are not dilated, and the flagellum is short. The merus-joint of the exterior maxillipedes is usually truncated at the distal extremity, and emarginate at the antero-internal angle, and with the antero-external angle sometimes somewhat produced. The chelipedes, in the adult male, are well developed, and sometimes large and massive, with the palm dilated and compressed, fingers, when closed, with a wide intermarginal hiatus; more rarely they are more slender, with the fingers nearly meeting when closed. The ambulatory legs are of moderate length, sometimes spinose; dactyli nearly straight or slightly curved.

The species are rather numerous, and are, I believe, confined to the coasts of America and islands adjacent; they sometimes inhabit considerable depths.

They have already been enumerated and described by A. Milne Edwards in his fine work above cited. In the list which follows a few are added which have since been described, and a somewhat different arrangement is adopted. The genus *Nemausa*, A. Milne Edwards, is here regarded as a subgenus of *Mithrax*.

[1] The subfamily Othoniinæ, including the two genera *Othonia*, Bell, and *Cyclocæloma*, Miers, is not represented in the Challenger collection.

Subgenus *Nemausa*, A. Milne Edwards.

Nemausa, A. Milne Edwards (genus), Crust. in Miss. Sci. au Méxique, p. 80, 1875.
,, Miers, *tom. cit.*, p. 666.

Carapace subpyriform, much longer than broad; spines of rostrum well developed, slender, acute. Epistoma scarcely transverse. Basal antennal joint with a long spine at its antero-external angle. Merus of the exterior maxillipedes produced at its antero-external angle. Chelipedes of moderate size; palm rather slender, compressed.

M. A. Milne Edwards refers the following species to this genus, or subgenus as I prefer to regard it:—

Nemausa rostrata, A. Milne Edwards. Gulf of Mexico and Caribbean Sea (to 163 fathoms); Bermuda. (The name *rostrata* has been used by Bell (*vide infra*) for a true *Mithrax*).

Nemausa spinipes (Bell). Galapagos Islands; (Cape?) St. Elena, to 16 fathoms.

Mithrax (*Nemausa*) *rostrata*.

Nemausa rostrata, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, vol. i. p. 81, pl. xvii. fig. 4, 1875.

Bermuda, shallow water (a male and female).

In these specimens the spines of the rostrum are somewhat shorter and the tubercles of the carapace are less symmetrically disposed than in A. Milne Edwards' figure; in the smaller specimen there is but one spine upon the sides of the branchial regions, the others being represented by rounded tubercles.

♂.	Lines.	Millims.
Length of carapace and rostrum,	10½	22
Breadth of carapace,	8	17
Chelipedes (deficient).		
Length of first ambulatory leg,	13	27·5

Subgenus *Mithrax*.

Mithrax and *Mithraculus*, Miers, *tom. cit.*, p. 667, 1879, et synonyma.

Carapace very broad and depressed, usually transverse; spines of rostrum very short or obsolete. Basal antennal joint very much enlarged, with short spines at the distal extremity. Chelipedes often large, with the palm compressed and more or less dilated.

1. Carapace with the branchial regions not dorsally sulcated, the lateral margin usually armed with spines.

(1) Spines of rostrum distinct, acute. Palms of chelipedes with or without spines on the superior margin.

a. Palms of chelipedes in the adult with spines on the upper margin.

Mithrax spinosissimus (Lamarck). Florida, West Indies (to 100 fathoms).

Mithrax cornutus (Saussure). West Indies; Florida Straits (to 589 fathoms); Bahia. (Specimens taken by Captain E. Cole, 46 miles south of Key-West, Florida, are in the British Museum Collection).

Mithrax aculeatus (Herbst). West Indies; Vera Cruz.[1]

b. Palms of chelipedes without spines.

Mithrax acuticornis, Stimpson. Near the Quicksands and Tortugas, to 42 fathoms (perhaps, as noted by A. Milne Edwards, the young of *Mithrax cornutus*).

Mithrax holderi, Stimpson. Tortugas.

Mithrax armatus, Saussure. West coast of America; Mazatlan.

Mithrax rostratus, Bell. ?

Mithrax ursus, Bell (= *Mithrax belli*, Gerstæcker, *nec Cancer ursus*, Herbst). Galapagos Islands; Chili (Brit. Mus.).

(2) Spines of rostrum short, tuberculiform or obsolete. Chelipedes with the palms unarmed.

Mithrax hispidus (Herbst) = *Mithrax pleuracanthus*, Stimpson, var. South Carolina; Florida Straits; West Indies (to 125 fathoms); Yucatan Channel, near the Jolbos Islands; Brazil (30 to 350 fathoms).

Mithrax lævimanus, Desbonne and Schramm. Guadeloupe.

Mithrax tuberculatus, Stimpson. California; Mazatlan.

Mithrax depressus, A. Milne Edwards. Guadeloupe; Woman Key.

Mithrax leucomelas, Desbonne and Schramm. Guadeloupe.

Mithrax verrucosus, Milne Edwards. West Indies.

Mithrax pygmæus, Bell. Panama (10 fathoms).

Mithrax triangulatus, Lockington. Gulf of California.

2. Carapace very much depressed, with smooth, shallow interspaces or sulci between the tubercles of the dorsal surface of the branchial regions; the lateral margins tuber-

[1] *Mithrax trispinosus*, Kingsley (*Proc. Boston Soc. Nat. Hist.*, vol. xx. p. 148, 1879), from Florida, has three accessory spines on each spine of the rostrum. It is not stated whether the palms of the chelipedes are spinuliferous; they are referred to as "naked." I have observed more or less distinct indications of accessory rostral spinules in *Mithrax spinosissimus* and *Mithrax aculeatus*.

culated (the chelipedes considerably enlarged); *Mithraculus*, White, ? *Teleophrys*, Stimpson.

The following species have been referred to this section or subgenus:—

Mithrax coronatus (Herbst). Central America; West Indies (to 30 fathoms); Brazil.

Mithrax sculptus, Lamarck (= *Mithrax minutus*, Saussure). West Indies; Fernando Noronha (7 to 20 fathoms).

Mithrax nodosus, Bell. Galapagos Islands; Chili (Brit. Mus.).

Mithrax denticulatus, Bell. Galapagos Island; California; Cape St. Lucas; Guyaquil (Brit. Mus.).

Mithrax forceps, A. Milne Edwards. Guiana; West Indies; Bermuda; Bahia; Fernando Noronha?

Mithrax nudus, A. Milne Edwards. Guadeloupe.

Mithrax rubei, A. Milne Edwards. Cuba.

Mithrax cinctimanus, Stimpson (= *Mithrax affinis*, Desbonne and Schramm). Gulf of Mexico; Florida Straits; West Indies (to 37 fathoms).

Mithrax areolatus, Lockington. Gulf of California.

Mithrax hirsutipes, Kingsley. Key-West.

? *Mithrax cristulipes* (Stimpson). California; Cape St. Lucas; Bay of Panama.

Mithrax cornutus, de Saussure.

Mithrax cornutus, de Saussure, Rev. et Mag. Zool., ser. 2, vol. ix. p. 501, 1857; Mém. Soc. Phys. d. Genève., vol. xiv. pt. 2, p. 423, 1858.
„ „ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, vol. i. p. 97, pl. xxii., 1875.

Four males of rather small size were obtained in shallow water at Bahia. I subjoin the dimensions of the largest and smallest specimens:—

a. (♂ adult, but not fully grown). This specimen nearly resembles A. Milne Edwards' fine delineation of the large adult male, but the spines of the carapace and limbs are less prominent; there are two, not four teeth on the upper orbital margins, and the tubercles of the upper margin of the palms of the chelipedes do not extend quite so far toward its distal extremity.

♂.	Lines.	Millims.
Length of carapace to base of rostrum, nearly	13	27
Length of a rostral spine, nearly	2	4
Greatest breadth of a carapace, nearly	12	25
Length of a chelipede,	20½	43·5

b. (♂ young). In this example the palms of the chelipedes are slender, smooth, nearly devoid of tubercles on their upper margins:—

♂.	Lines.	Millims.
Length of carapace to base of rostrum, about	7½	16
Length of a rostral spine, about	1½	3
Greatest breadth of carapace, about	6½	14
Length of a chelipede,	9	19

In a specimen of somewhat larger size the chelipedes are slender, and there are a few small tubercles on the upper margin of the palm near to the base.[1]

Mithrax hispidus, var. *pleuracanthus*, Stimpson.

Cancer hispidus, Herbst, Naturgesch. der Krabben u. Krebse, Heft 8, p. 247, pl. xviii. fig. 100, 1790.
Mithrax hispidus, Milne Edwards, Guérin, Mag. de Zool. (Cl. vii.), 1832–38; Hist. Nat. Crust., vol. i. p. 322, 1834.
„ „ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 93, pl. xxi. fig. 1, 1875.
„ *pleuracanthus*, Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 116, 1870.
„ „ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, p. 95, pl. xx. fig. 3, 1875.

Brazil, South of Pernambuco, in 30 to 350 fathoms, lat. 9° 5′ 0″ S. to 9° 10′ 0″ S., long. 34° 49′ 0″ W. to 34° 53′ 0″ W. (Stations 122 to 122c). Two small males.

In the larger of these specimens the carapace measures only about 6 lines (12·5 mm.) in length and breadth, but in all its characters resembles large adults, except in having the tubercles of the dorsal surface of the carapace more distinct; in particular, I may note that the accessory spinule of the second and third antero-lateral marginal teeth is very distinctly developed. In the smallest specimen (length of carapace little over 3 lines or 7 mm.) the accessory spinule is discernible only on the third antero-lateral tooth.

In another small male specimen from the same locality and depth (length nearly 4 lines (8 mm.) the carapace is slightly narrower, more distinctly sulcated, and the teeth of the antero-lateral margins are all of them simple; this may belong to a distinct species, allied to *Mithrax forceps*, from fully grown examples of which it is only distinguished by the narrower carapace, or it may even be a variety of that species.

Mithrax forceps (A. Milne Edwards).

Mithraculus forceps, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, vol. i. p. 109, pl. xxiii. fig. 1, 1875.

An adult female was obtained at Bermuda on the shore, and another at Bahia in shallow water.

[1] By A. Milne Edwards *Mithrax acuticornis*, Stimpson, is regarded as the young of this species. Stimpson's diagnosis, however, scarcely suffices to determine this point; specimens which have been referred to *Mithrax acuticornis* in the collection of the British Museum, are distinguished, not merely by the absence of spines from the palms of the chelipedes, but also by the non-spinuliferous wrists. *Mithrax cornutus* is nearly allied to *Mithrax spinosissimus*, Saussure, in the spiniferous palms of the chelipedes and in the distinctly developed spines of the rostrum.

These specimens agree with Milne Edwards' description and figure in all particulars, except in having the ridges of the branchial regions somewhat more prominent and defined by deeper intervening depressions; there are obscure indications of a transverse series of five tubercles upon the front of the gastric region in the smaller specimen (that from Bahia) which do not exist in the larger specimen and in the figure of Milne Edwards.

The dimensions of the specimen from Bermuda are as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum,	6½	14
Breadth of carapace, nearly	7½	15·5
Length of a chelipede,	9½	20
Length of first ambulatory leg,	9½	20

Several small and not nearly fully grown *Mithraculi* are in the Challenger collection from Fernando Noronha, 7 to 20 fathoms, which may belong to this or to a distinct species; they differ in having the dorsal surface of the carapace much less distinctly tuberculated, and in possessing more slender ambulatory legs. In the largest the carapace is not 3 lines in length (6 mm.).

Mithrax coronatus (Herbst).

Cancer coronatus, Herbst, Naturgesch. der Krabben u. Krebse, vol. i. p. 184, pl. xi. fig. 63, 1790.
Cancer coryphe, Herbst, *tom. cit.*, p. 8, pl. iii. 1801.
Mithraculus coronatus, White (part), List Crust. Brit. Mus., p. 7, 1847.
" " A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 106, pl. xx. fig. 1, 1875, and references to literature.

A very small male and female collected at Fernando Noronha, in 7 to 20 fathoms, are referred to this species, as distinguished and figured by A. Milne Edwards.

♂.	Lines.	Millims.
Length of carapace, nearly	3	6
Breadth, nearly	3½	7
Length of a chelipede,	3½	7·5
Length of first ambulatory leg, nearly	4	8

Mithrax sp. (Pl. X. fig. 3).

To render the account of the Challenger specimens of this genus complete, I subjoin a description of a specimen which I cannot refer to any species of the genus, but to which I do not apply any specific name, as it is of extremely small size, and the characters are probably not those of the fully grown individual.

It resembles the *Mithraculus hirsutipes*, Kingsley,[1] from Key West, Florida, in the four-toothed antero-lateral margins of the carapace, the strongly curved dactyle of the ambulatory legs, and in some other characters; but the ambulatory legs are almost naked, not strongly hirsute as in *Mithrax hirsutipes*, the tubercles of the dorsal surface of the carapace are more numerous, and the carpus of the chelipedes tuberculated.

The carapace is about as long as broad, its dorsal surface nearly smooth and covered with scattered tubercles which are disposed as follows; two immediately behind the base of the rostrum, two on the frontal region of the carapace between the orbits, four in a transverse series on the gastric region, one in the centre of the cardiac region, two on the posterior margin of the carapace (placed one on either side of the median line) and several on each branchial region, the largest of which is subspiniform and placed near to the postero-lateral margin; the antero-lateral margins (as already stated) are four-toothed; the first tooth is tuberculiform and placed near to the outer angle of the orbit, the three following spiniform, the last the largest. The rostrum is short, rather deeply bifid; there is a strong tooth or spine above the inner angle of the orbit, but none at its outer angle, and a rather obscure notch in the middle of its upper and lower margins. All the joints of the post-abdomen (in the male) are distinct. The basal antennal joint is considerably dilated and has a strong spine at its antero-external angle, which spine is visible from above, beneath the spine at the inner angle of the orbit, in a dorsal view. The chelipedes are well developed; the merus and also the carpus armed with tubercles above and on the outer surface; the palm enlarged and laterally compressed, but not carinated on its upper and lower margins. The fingers meet only at the denticulated apices and have between them a hiatus when closed, and both dactyl and pollex are armed besides with three tubercles on their inner margins. The ambulatory legs are nearly naked, and are armed (except the dactyli) with strong spines, which are strongest on the upper margins of the merus and carpus-joints, and the dactyli are strongly incurved near the apices. Colour (in spirit) light reddish-brown above, white below; a longitudinal band of white along the middle of the carapace on the dorsal surface. There are a few scattered hairs on the dactyli and penultimate joints of the ambulatory legs.

♂.	Lines.	Millims.
Length and breadth of carapace, about	$2\frac{1}{2}$	5
Length of a chelipede, nearly	3	6

The single specimen (a male) was dredged together with small specimens of *Mithraculus sculptus* at Fernando Noronha, in 7 to 20 fathoms.

In the strongly tuberculated wrists of the chelipedes and in the spinuliferous ambulatory legs, this form resembles *Mithrax ursus*, Bell, near to which species it must, I think, be ranged.

[1] *Proc. Acad. Nat. Sci. Philad.*, p. 147, 1879.

Legion II. PARTHENOPINEA.

Parthenopinea, Dana, U.S. Expl. Exped., vol. xiii., Crust. i., pp. 77, 136, 1852.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 641, 1879.

Basal antennal joint very small and embedded with the next joint in the narrow hiatus between the front and the inner subocular angle of the orbit; the infraocular space being mainly occupied by the inferior wall of the orbit.

Family IV. PARTHENOPIDÆ.

Parthenopidæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. pp. 641–667, 1879.

Eyes usually retractile within the small circular and well-defined orbits; the inferior wall of the orbit is continued to within a very short distance of the front. The antennæ are very slender; the basal joint does not, as in the Periceridæ, constitute a great part of the inferior orbital margin, but is very small and usually does not reach to the front, and with the next joint occupies the narrow hiatus intervening between the front and inner subocular angle of the orbit. (In the genus *Ceratocarcinus* the antennæ are completely excluded from the orbits.)

This family presents some affinities with the *Oxystomata*, and also as regards the structure of the orbits and the position of the antennæ with certain genera of the Cancridæ.

Subfamily 1. PARTHENOPINÆ.

Parthenopinæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 668, 1879.

Carapace equilaterally or transversely triangulate or elliptical. Rostrum simple. Strongly-marked depressions exist, separating the branchial from the cardiac and gastric regions. Chelipedes greatly developed, with the palm trigonous, fingers acute.

Lambrus, Leach.

Lambrus, Leach, Trans. Linn. Soc. Lond., vol. xi. pp. 308, 310, 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 352, 1834.
„ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 146, 1878.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 668, 1879.

Carapace equilaterally subtriangulate, convex or depressed, with the rostrum usually prominent, triangulate and somewhat deflexed, the lateral margins rounded at the branchial regions and armed with tubercles or spines, which, on the postero-lateral margins are sometimes considerably elongated, orbits small and well defined, with a fissure (which is usually closed) in the superior margin, the interior subocular lobe is sometimes greatly developed. Epistoma usually transverse. The pterygostomian regions (in certain species) are more or less distinctly rigid, as in the genus *Solenolambrus*,

Stimpson. The post-abdomen, in the male, covers the sternum at the base between the fifth pair of legs, and is five or six-jointed, with two or three of the intermediate segments coalescent. Eyes short, robust. Antennules usually obliquely plicated, with the basal joint considerably developed. The basal (or real second) joint of the antennæ is short, not markedly dilated, and does not reach the front; the next joint occupies the interior hiatus of the orbit. The exterior maxillipedes present nothing remarkable; the ischium is not produced at its antero-internal angle; the merus is distally truncated and bears the next joint at its antero-internal angle, and the exognath is slender and straight. Chelipedes (in the male) subequal and either very considerably elongated (typical *Lambrus*), or of moderate length (subgenus *Parthenopoides*, Miers); the merus and palm are elongated and usually spinose or tuberculated; palm trigonous, and armed with a denticulated or spinose crest along the superior and internal margin; fingers short, distally acute, and dentated on the internal margins. Ambulatory legs slender and of moderate length, with the merus-joints sometimes denticulated or tuberculated on the margins; dactyli styliform.

The species of this genus are very numerous and are probably found in all the warmer temperate and tropical seas of the globe, usually in shallow, but sometimes in deeper water.

They have recently been subdivided by Dr. A. Milne Edwards into ten genera.[1]

Of these genera, one, two, or perhaps three (*Rhinolambrus*, A Milne Edwards, *Platylambrus*, A. Milne Edwards, and *Leiolambrus*, A. Milne Edwards), I think are insufficiently characterized; a fourth, *Parthenolambrus*, A. Milne Edwards, corresponds nearly to my *Parthenopoides*, established in 1879 (when I had not seen the work of A. Milne Edwards). Four of the remaining genera (*i.e.*, *Solenolambrus*, Stimpson, *Mesorhœa*, Stimpson, *Enoplolambrus*, A. Milne Edwards, and *Pisolambrus*, A. Milne Edwards), are not represented in the Challenger collection.

Since Dr. A. Milne Edwards has not indicated with anything like completeness the species which are to be referred to the subgenera established by him, I give below lists, as complete as I can make them, of the species referable to the subgenera represented in the collection of H.M.S. Challenger.

Subgenus *Lambrus*, A. Milne Edwards.

Lambrus, A. Milne Edwards (subgen.) Crust. in Miss. Sci. au Méxique, pt. 5, p. 146, 1878.
„ Miers, Journ. Linn. Soc. Lond., *tom. cit.*, p. 672, 1879.
Platylambrus, Stimpson (part), Bull. Mus. Comp. Zool., vol. ii. p. 129, 1870.
Rhinolambrus, A. Milne Edwards, (part), Crust. in Miss. Sci. au Méxique, pt. 5, p. 148, 1878.

Carapace moderately convex, and not produced over the bases of the legs, rarely depressed, with the rostrum and epistoma well developed, the lateral epibranchial spine

[1] Crust. in Miss. Sci. au Méxique, pt. 5, p. 146, 1878.

absent or but slightly developed. Chelipedes very considerably elongated, palm and merus usually armed with strong spines.

The pterygostomian regions are sometimes slightly excavated and carinated, but the smooth deep channel characterising the subgenus *Aulacolambrus* is not developed.[1]

The species referable to this subgenus may be divided into two sections as follows:—

1. Merus-joints of ambulatory legs more or less spinose or tuberculated—

Atlantic and Mediterranean Species.

Lambrus macrocheles (Herbst) = *Lambrus mediterraneus*, Roux. Mediterranean; West Africa, to 49 fathoms (Studer).
Lambrus rugosus, Stimpson. Cape Verde Islands (to 20 fathoms).
Lambrus bouvieri, A. Milne Edwards. St. Vincent.
Lambrus setubalensis, B. Capello. Setubal.
Lambrus verrucosus, Studer. Ascension Island (to 60 fathoms).
Lambrus pourtalesii, Stimpson. Florida Straits (to 117 fathoms).
Lambrus fraterculus, Stimpson. Florida Straits (to 68 fathoms).

Indo-Pacific Species.

Lambrus longimanus (Linné ?). Indo-Pacific Region (to 100 fathoms).
Lambrus contrarius (Herbst). "East Indies" (Herbst); Samboangan, Philippines; Mauritius.
Lambrus echinatus (Herbst). India (Coromandel, Pondicherry); Mauritius.
Lambrus laciniatus, De Haan. Japan (5 to 20 fathoms).
Lambrus validus, De Haan. Japan.
Lambrus lamelliger, White (= *Lambrus lamellifrons*, Adams and White, and *Lambrus rumphii*, Bleeker). Indo-Malayan Seas; Philippines.
Lambrus tuberculosus, Stimpson. Hong Kong (to 15 fathoms).
Lambrus intermedius, Miers. Corean Seas; North and West Australia; Shark Bay (?).
Lambrus longispinus, Miers (= *Lambrus spinifer*, Haswell). North and North-east Australia (to 14 fathoms); Shanghai.
Lambrus holdsworthii, Miers. Ceylon.
Lambrus lævicarpus, Miers. Oriental Seas.
Lambrus mossambicanus (Bianconi). Mozambique.

[1] The type of this subgenus is *Lambrus longimanus* (Linné), not, as stated by a *lapsus calami* in Journ. Linn. Soc. Lond., (vol. xiv. p. 672, 1879), *Lambrus crenulatus*, Saussure.

West American Species.

Lambrus hyponcus, Stimpson. Panama, Mexico; Mazatlan. (This species establishes the transition to the next section).

2. Merus-joints of the ambulatory legs without distinct spines or tubercles—

Atlantic and Mediterranean Species.

Lambrus angulifrons (Latreille) = *Parthenope longimana*, Costa. Mediterranean (to 50 fathoms, Heller).

Lambrus serratus, Milne Edwards = *Lambrus crenulatus*, Saussure. West Indies (to 13 fathoms); Bahia.

Lambrus agonus, Stimpson. West Indies and Florida Straits (to 84 fathoms).

Lambrus guérinii, B. Capello. West Indies and Bahia; Mauritius (type). This species, it will be noted, is found in both the Atlantic and Indo-Pacific Regions.

West American Species.

Lambrus depressinoculus, Stimpson. Mexico; Manzanillo

Indo-Pacific Species.

Lambrus pelagicus, Rüppell. Red Sea.

Lambrus turriger, Adams and White. Philippine Islands; Amboina (15 to 25 fathoms); Borneo; North and North-west Australia (to 36 fathoms).

Lambrus rhombicus, Dana. Vanua Levu, Fiji Islands.

Lambrus gracilis, Dana. Ovalau, Fiji Islands.

Lambrus nodosus, Jacq. and Lucas. North, North-east and West Australia; New Zealand.

Lambrus affinis, A. Milne Edwards. Indo-Pacific Region (Seychelles to New Caledonia).

Lambrus deflexifrons, Miers. Ceylon. (This species perhaps forms a distinct subgenus).

Lambrus contrarius (Herbst).

Cancer contrarius, Herbst, Naturgesch. der Krabben u. Krebse, vol. iv., Heft. 4, p. 8, pl. lx. fig. 3; 1804.

Lambrus spinimanus, Desmarest, Consid. sur la Classe des Crust., p. 36, pl. iii. fig. 1, 1825.

„ *contrarius*, Milne Edwards, Hist. Nat. Crust., vol. i. p. 354, 1834.

Samboangan, Philippines, 10 fathoms (a female).

The figure of Herbst is a very inexact representation of this species, if the specimens

referred to it in the British Museum and Challenger collection are rightly designated. It is much better delineated in Desmarest's figure of *Lambrus spinimanus*, which is cited by Milne Edwards as synonymous with *Lambrus contrarius*.

The Challenger example has the following dimensions :—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum,	18½	41
Breadth of carapace, nearly	17½	36·5
Length of a chelipede,	44½	94·5
Length of first ambulatory leg, nearly	25	52·5

Lambrus longimanus (Linné).

? *Cancer longimanus*, ♀, Linné, Mus. Ludovici Ulrici, p. 441, 1764; Syst. Nat., ed. xii., p. 1047, 1766.
Lambrus longimanus, Leach, Trans. Linn. Soc. Lond., vol. xi. p. 310, 1815.
" " Milne Edwards, Hist. Nat. Crust., vol. i. p. 354, 1834; Atlas in Latr. Règne Animal de Cuvier, Crust., pl. xxvi. fig. 1.
" " Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. iv. p. 20, 1879.

South of New Guinea, 28 fathoms, in lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (Station 188) (two males and two females); Amboina, 100 fathoms (a small female).

The specimens thus designated are certainly the *Lambrus longimanus* of Milne Edwards, as figured in the large illustrated edition of the Règne Animal de Cuvier (*loc. cit.*), but in his description of the same species in his Histoire naturelle des Crustacés the lateral margins of the carapace are described as "armés d'épines très-longues et légèrement rameuses," a character inapplicable to any specimens which have come under my observation.

The largest of the Challenger specimens (a female) measures as follows :—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum, nearly	10½	22
Breadth of carapace, nearly	11	23
Length of a chelipede,	36½	77
Length of first ambulatory leg,	15	31·5

Lambrus affinis, A. Milne Edwards.

Lambrus affinis, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. viii. p. 261, pl. xiv. fig. 4, 1872.

"Torres Strait, August 1874" (an adult male).

In this species the merus-joints of the ambulatory legs are smooth; in the following (*Lambrus intermedius*), they are compressed, and the last two pairs are more or less distinctly granulated on the margins.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, rather over	7	15
Breadth of carapace, nearly	7	14·5
Length of a chelipede,	20	42
Length of first ambulatory leg, nearly	11	23

Lambrus intermedius, Miers (Pl. X. fig. 4).

Lambrus intermedius, Miers, Proc. Zool. Soc. Lond., p. 30, 1879.

Torres Strait, 6 fathoms (Station 187), lat. 10° 36′ 0″ S., long. 141° 55′ 0″ E. (a small male).

This species may be regarded as intermediate in position between *Lambrus affinis* and *Lambrus nodosus*. The figure now given is from the type, from the Corean Seas, in the collection of the British Museum, which, being of much larger size than the Challenger specimen, better represents its characteristic peculiarities. Whether it is to be regarded as a small variety of one or the other above-mentioned species a larger series is needed to determine. I have elsewhere referred to its affinities with *Lambrus nodosus*.

Lambrus turriger, White.

Lambrus turriger, White, Proc. Zool. Soc. Lond., p. 58, 1847.
„ „ Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 26, pl. v. fig. 2, 1848.
„ „ Miers, Crust. Rep. in Zool. Col. H.M.S. "Alert," p. 201, 1884.

A fine adult male was dredged at Amboina, in 15 to 25 fathoms.

In this specimen the principal dimensions are as follows :—

Adult ♂.	Lines.	Millims.
Length of the carapace and rostrum,	7	15
Greatest breadth of carapace,	6½	13·5
Length of a chelipede, rather over	39	83
Length of first ambulatory leg, about	14	30

There are several tubercles on the gastric, cardiac, and branchial regions of the carapace, besides the long vertical spines which always characterize this species.

Lambrus guérinii, var. ? Capello.

Lambrus guérinii, F. de B. Capello, Journ. de Sci. Math. Phys. Nat. de Lisboa, vol. iii. p. 264, pl. iii*a*. fig. 5, 1871.

Bahia, shallow water (an adult female and a smaller male).

These specimens are referred to *Lambrus guérinii* with much uncertainty, since the types of that species were from the Mauritius; they only differ from Capello's figure in

the somewhat greater prominence of the spines of the outer margin of the hand; three of the tubercles of the gastric region, and one on the cardiac and on each branchial region, are more elevated than the others, and from some of the elevated tubercles of the carapace spring long tufts of hairs, which are not shown in the figure of *Lambrus guérinii* (notably from the præocular tubercles and the elevated tubercles of the gastric and branchial regions). These tufts are absent, however, from some Brazilian and West Indian examples in the collection of the British Museum.

The dimensions of the female are:—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum, about	13	28
Breadth of carapace,	14½	31
Length of a chelipede, about	28½	60
Length of first ambulatory leg,	15½	33

Lambrus serratus, Milne Edwards.

Lambrus serratus, Milne Edwards, Hist. Nat. Crust., vol. i. p. 357, 1834.
Platylambrus serratus, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, i. p. 156, pl. xxx. fig. 1, 1878, et synonyma.
Lambrus lupoides, White, List Crust. Brit. Mus., p. 12, 1847.

Bahia, shallow water (an adult male and female).

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	9	19
Breadth of carapace, about	10	21
Length of a chelipede, about	28½	61
Length of first ambulatory leg,	12½	26

If the subgenus *Platylambrus*, A. Milne Edwards, be retained, it will probably be best restricted to this species, and, perhaps, *Lambrus granulatus*, Kingsley.

Subgenus *Aulacolambrus*, A. Milne Edwards.

Aulacolambrus, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 147, 1878.

Carapace depressed, with the rostrum and epistoma very short, the lateral epibranchial spine very considerably elongated. The buccal cavity is bordered laterally by a deep, smooth and wide cavity extending from the branchial aperture at the base of the chelipedes nearly to the orbits. The chelipedes are greatly elongated, and the palm and merus are armed with long spines.

The following species are referable to this subgenus :—

Lambrus hoplonotus, Adams and White, and vars. *longioculis*, Miers; *planifrons*, Miers, and *granulosus*, Miers. Indo-Pacific Seas (Ceylon to New Caledonia; to 28 fathoms).

Lambrus pisoides, Adams and White. Philippines.

Lambrus diacanthus, De Haan. Japan.

Lambrus sculptus, A. Milne Edwards. New Caledonia; Fiji Islands (Coll. Brit. Mus.).

Lambrus whitei, A. Milne Edwards (=*Lambrus carenatus*, White, *nec* Milne Edwards). Borneo; China Sea.

Lambrus curvispinus, Miers. Java Sea. (This species is perhaps a variety of *Lambrus hoplonotus*).

Lambrus (*Aulacolambrus*) *hoplonotus*, Adams and White.

Lambrus hoplonotus, Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 35, pl. vii. fig. 3, 1848.

„ „ Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. iv. p. 23, 1879.

Off Cape York, 8 fathoms, in lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E.; Station 186 (an adult male).

This specimen differs from the typical example in having the tubercles of the post-frontal and hepatic regions of the carapace even larger and more flattened; in the middle line of the carapace, on the gastric and cardiac regions, are two somewhat more elevated and subspiniform tubercles. The six spines of the outer (or posterior) margin of the chelipedes are very much elongated and of equal length, and are slightly knobbed at the tips. These characters are perhaps sufficient to permit of the distinction of this specimen as a fourth variety of this protean species, but for the present I will not designate it by a distinct appellation. Its dimensions are as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	10½	22·5
Breadth of carapace to base of lateral epibranchial spine,	10	21
Length of a chelipede,	25	52·5
Length of first ambulatory leg,	14	30

Lambrus hoplonotus, var. *granulosus*, Miers (Pl. X. fig. 5).

Lambrus hoplonotus, var. *granulosus*, Miers, *tom. cit.*, p. 23, 1879; Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 202, 1884.

Torres Strait, 3 to 11 fathoms (a small but adult female).

Lambrus hoplonotus, var. *longioculis*, Miers.

Lambrus hoplonotus, var. *longioculis*, Miers, *tom. cit.*, p. 23, pl. v. fig. 6, 1879.

South of New Guinea, 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E., Station 188 (a female).

This variety is best distinguishable by the subspiniform tubercles of the branchial regions.

Subgenus *Parthenolambrus*, A. Milne Edwards.

Parthenolambrus, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 148, 1878.
Parthenopoides, Miers, Journ. Linn. Soc. Lond., *tom. cit.*, p. 672, 1879.

Carapace often crowded, subtriangulate, with the posterior margin nearly straight, and produced at the postero-lateral angles over the bases of the ambulatory legs. Chelipedes rarely spinose and of moderate length (rarely exceeding two and a half times the length of the carapace).

Lambrus massena, Roux, which is placed by A. Milne-Edwards in his *Rhinolambrus*, must, I think, be included in this subgenus.

The following species are referable to this subgenus :—

Atlantic and Mediterranean Species.

Lambrus massena, Roux = *Parthenope contracta*, Costa, *fide* Heller (?) *Lambrus rugosus*, Stimpson, and var. *goreensis* (*Spinifer*), Miers, and *atlanticus*, Miers. Mediterranean (70 to 75 metres); Senegambia (9 to 15 fathoms); Cape Verde Islands; Azores, 50 to 90 fathoms.

Lambrus pulchellus, A. Milne Edwards. Cape St. Vincent.

Lambrus bicarinatus, Miers. Senegambia; Goree Island (9 to 15 fathoms), Canaries.

Lambrus expansus, Miers. Madeira; Azores, off Fayal (50 to 90 fathoms).

Indo-Pacific Species.

Lambrus calappoides, Adams and White. Philippines; Tongatabu (18 fathoms); Seychelles, 4 to 12 fathoms.

Lambrus harpax, Adams and White (= *Lambrus, Parthenope, sandrockii*, Haswell). North and North-east Australia (to 14 fathoms); China, Borneo.

Lambrus tarpeius, Adams and White. Oriental Seas.

Lambrus erosus, Miers. Oriental Seas.

Species of Unknown Habitat.

Lambrus trigonius, A. Milne Edwards.

West-American Species.

Lambrus excavatus, Stimpson. Mexico; Manzanillo.
Lambrus triangulus, Stimpson. Cape St. Lucas.
Lambrus frons-acutis, Lockington. California (Simaloa, Santa Catalina).[1]

Lambrus (*Parthenolambrus*) *massena*, Roux.

Lambrus massena, Roux, Crust. de la Méditerranée, pl. xxiii., 1830.
" " Milne Edwards, Hist. Nat. Crust., vol. i. p. 356, 1834.
" " Lucas, Animaux Articulés in Explor. Scientif. de l'Algérie, vol. i. (Crust.), p. 10, pl. i. fig. 3 ♀, 1849.
? *Lambrus rugosus*, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 220, 1857.
Lambrus (*Parthenopoides*) *massena*, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. viii. p. 207, 1881.

A male and a female of what I have regarded (in the absence of types for comparison) as the typical form of this variable species were collected—the male at St. Vincent, Cape Verde Islands, in July 1873, the female at the Azores, off Fayal, in 50 to 90 fathoms.

♂.	Lines.	Millims.
Length and breadth of carapace and rostrum,	3½	7·5
Length of a chelipede,	5½	11·5
Length of first ambulatory leg, about	4	9

Lambrus massena, Roux, var. *atlanticus*, Miers.

Lambrus massena, var. *atlanticus*, Miers, *tom. cit.*, p. 208, 1881.

St. Vincent, Cape Verde Islands (with the typical form) two males. The dimensions of the larger, which has lost nearly all the ambulatory legs are as follows:—

♂.	Lines.	Millims.
Length and breadth of carapace and rostrum,	4	8·5
Length of a chelipede, nearly	6	12·5

Lambrus (*Parthenolambrus*) *expansus*, Miers.

Lambrus (*Parthenopoides*) *expansus*, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. iv. p. 25, pl. v. fig. 9, 1879.

Azores, off Fayal, in 50 to 90 fathoms. Two males and a female were collected.

The colour (even in the spirit-preserved specimens) varies considerably; the ground-colour in all three specimens is a light pinkish-yellow, with slaty-coloured markings on the chelipedes. In the smaller male the carapace is covered with similar

[1] M. A. Milne Edwards has recently described two species of *Lambrus* from Upolu, one of the Samoan Islands, which I cannot with certainty refer to any one section of this genus; they are *Lambrus gracilipes*, A. Milne Edwards, and *Lambrus pugilator*, A. Milne Edwards; the latter is perhaps a species of *Aulacolambrus*.

coloured spots, which are wholly absent from the carapace of the larger male and the female; in the latter the frontal and gastric regions and the sides of the branchial regions are of a brick-red colour.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum, about,	4½	10
Breadth of carapace, nearly,	6	11
Length of a chelipede,	8	17
Length of first ambulatory leg, nearly	5	10·5

Lambrus (*Parthenolambrus*) *calappoides* (Adams and White).

Parthenope calappoides, Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 34, pl. v. fig. 5, 1848.
„ „ Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 527, 1864.

A male obtained in 18 fathoms, off Tongatabu (Station 172) is referred to this species.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	5	10·5
Breadth of carapace,	6½	13·5
Length of a chelipede, nearly	8	16·5
Length of first ambulatory leg,	5	10·5

Cryptopodia, Milne-Edwards.

Cryptopodia, Milne Edwards, Hist. Nat. Crust., vol. i. p. 360, 1834.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 669, 1879.

Carapace very broadly triangulate, with very large lateral clypeiform inferiorly vaulted expansions which completely conceal the ambulatory legs, and are prolonged posteriorly far beyond the base of the post-abdomen; the space between the gastric and the cardiac regions is triangular, concave, and defined by four tubercles or eminences, of which one is placed on the gastric, one on the front of the cardiac, and one on each branchial region. The front is nearly horizontal, subtriangulate, spatuliform and very prominent. The pterygostomian regions are smooth, not ridged. The orbits are very small, nearly circular, with a narrow fissure in the superior margin. The epistoma is well developed; the antennulary fossettes are narrow and somewhat oblique. The post-abdomen, in the male, is five-jointed; the third to fifth segments coalescent. The eyes are very small and retractile. The basal antennal joint is slightly dilated and does not nearly attain the apex of the interior subocular lobe of the orbit; the following joint lies within the interior orbital hiatus. The buccal cavity and exterior maxillipedes are small. The ischium-joint of the endognath of the maxillipedes is not produced at its antero-internal angle; the merus is distally truncated, with the antero-external angle slightly

produced, the interior margin notched below the antero-internal angle. The chelipedes are nearly as in *Lambrus;* the merus-joint has a wing-like lobe on the posterior margin near to the distal extremity; the palms of the chelipedes are elongated, tricarinated, and dentated (as in *Lambrus*); fingers short and more or less distinctly dentated on the inner margins. The ambulatory legs are slender and decrease successively but slightly in length, with the fourth, fifth and sixth joints more or less distinctly carinated; dactyli nearly straight.

The species, which have been enumerated by A. Milne Edwards, occur for the most part in the Oriental region, in water of moderate depth, but a species also occurs in the Gulf of Mexico and another on the coast of California.[1]

To the species mentioned by A. Milne Edwards is to be added: *Cryptopodia spatulifrons*, Miers (with var. *lævimana*, Miers), which occurs on the coasts of North-east and West Australia and Borneo.

Cryptopodia fornicata (Fabricius).

Cancer fornicatus, Fabr., Spec. Insect., vol. ii. Append., p. 502, 1781.
Cryptopodia fornicata, Milne Edwards, Hist. Nat. Crust., vol. i. p. 362, 1834, et synonyma.
„ „ Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 203, 1884.
Parthenope (*Cryptopodia*) *fornicata*, De Haan, Crust. in v. Siebold, Fauna Japonica, p. 90, pl. xx. fig. 2 ♂, 1839.

South of New Guinea, in 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (Station 188), a female of rather small size.

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	9	19
Breadth of carapace, nearly	14	29·5
Length of a chelipede,	12	25·5
Length of first ambulatory leg,	6½	14

Heterocrypta, Stimpson.

Heterocrypta, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. x. p. 102, 1871.
„ Miers, Journ. Linn. Soc. Lond. (Zool.) vol. xiv. p. 669, 1871.

This genus is very nearly allied to the preceding (*Cryptopodia*), and it may suffice here to indicate the principal characters by which it is distinguished.

The clypeiform expansions of the carapace are less produced than in the Oriental species of that genus and cover only the bases of the ambulatory legs, and the carapace is scarcely, if at all, posteriorly produced beyond the base of the post-abdomen; its dorsal lobes and carinæ are more developed. The pterygostomian and subhepatic regions are traversed by a granulated ridge running parallel to the antero-lateral margins of the carapace, which terminates just above the antero-lateral angles of the buccal cavity.

[1] Crust. in Miss. Sci. au Méxique, pt. 5, p. 168, 1878.

I may add that the inferior wall of the orbit is slightly notched; the ischium of the exterior maxillipedes is slightly produced at its antero-internal angle, and the merus of the chelipedes is without the distal and posterior lobe which exists in most of the species of *Cryptopodia*.

The species of this genus are of small size. The following have been described:—

Heterocrypta granulata, Gibbes. East coast of United States, from Virginia to Florida; West Indies; St. Thomas; Bahia.

Heterocrypta macrobrachia, Stimpson. Coast of Mexico and Panama.

Heterocrypta maltzani, Miers = *Heterocrypta marionis*, A. Milne Edwards. Senegambia; Goree Island (9 to 15 fathoms); Bay of Toulon (450 metres); Azores (to 450 fathoms).

Heterocrypta granulata (Gibbes).

Cryptopodia granulata, Gibbes, Proc. Amer. Assoc. Adv. Sci., p. 173, 1850.
Heterocrypta granulata, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. x. p. 103, 1871.
" " A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 166, pl. xxix. fig. 4, 1878.

Bahia, shallow water, September 1873 (a female).

The carapace is more distinctly dentated on the postero-lateral margins, and the chelipedes are more slender than in Milne Edwards' figure of this species, and in these particulars resemble *Heterocrypta macrobrachia*, which is not improbably a mere variety of *Heterocrypta granulata*.

♀.	Lines.	Millims.
Length of carapace and rostrum, about	3	6·5
Breadth of carapace, nearly	4	8
Length of a chelipede, about	6	13
Length of first ambulatory leg,	3	6·5

Heterocrypta maltzani, Miers.

Heterocrypta maltzani, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. viii. p. 209, pl. xiii. fig. 1, September, 1881.
Heterocrypta marionis, A. Milne Edwards, Comptes Rendus, vol. xciii. p. 879, December, 1881; Ann. and Mag. Nat. Hist., ser. 5, vol. ix. p. 38, 1882, "Travailleur" (*planches ined.*).

This species was dredged at the Azores, Fayal, in 50 to 90 fathoms (male and female); and again at the Azores, in 450 fathoms; lat. 38° 38′ 0″ N., long. 28° 28′ 30″ W., Station 75 (an adult male).[1]

[1] Professor A. Milne Edwards having kindly sent to me advanced proofs of figures illustrative of this and other species collected in the "Travailleur" or "Blake" Expedition, I am enabled to satisfy myself of the identity of *Heterocrypta maltzani* and *Heterocrypta marionis*, which were almost contemporaneously described. Professor Milne Edwards' figure is perhaps a truer representation of average-sized examples than mine, which was founded on a specimen of large size.

The latter specimen measures as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	4	8·5
Breadth of carapace,	4	8·5
Length of a chelipede,	8½	18
Length of first ambulatory leg,	5	10·5

Subfamily 2. EUMEDONINÆ.

Eumedoninæ, Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 670, 1879.

Carapace usually rhomboidal or subpentagonal. Rostrum usually bifid or emarginate. Depressions separating the regions of the carapace obscure or non-existent. Anterior legs of moderate length, chelipedes not trigonous.

To the genera enumerated in the above cited memoir, *Rhabdonotus*, A. Milne Edwards, is perhaps to be added.

Ceratocarcinus, Adams and White.

Ceratocarcinus, Adams and White, Proc. Zool. Soc. Lond., p. 57, 1847; Crust. in Zool. H.M.S. "Samarang," p. 33, 1848.
„ Miers, Journ. Linn. Soc. Lond. (Zool.), vol. xiv. p. 670, 1879.

Carapace subhexagonal, about as broad as long, with the dorsal surface moderately convex, spinose or tuberculated. The spines of the rostrum are elongated, acute, and separated by a rather wide interspace, and there is a well-developed lateral epibranchial spine. The orbits are small, circular, excavated below and at the exterior angle, and the subocular lobe joins the front, so as completely to exclude the antennæ from the orbits. The post-abdomen, in the male, is seven-jointed.

The eyes are small, retractile. The basal (or real second) joint of the antennæ is slender and occupies the space between the base of the antennules and the inner subocular lobe. The exterior maxillipedes are small; the ischium-joint not produced at its antero-internal angle, the merus distally truncated, not produced at the antero-external angle, and scarcely emarginate at the antero-internal angle, where the next joint articulates. The chelipedes are slender and somewhat elongated, with the joints not dilated, the merus and carpus sometimes armed with spines; the dactyli acute, shorter than the palms and dentated on the inner margins; the ambulatory legs are slender, with the joints not dilated, the merus sometimes armed with a distal spine; the dactyli nearly straight.

The species, all of which are Oriental, are small. The following have been described:—

Ceratocarcinus longimanus, Adams and White. North Borneo; Balambangen.
Ceratocarcinus speciosus, Dana. Viti Levu, Fiji Islands.
Ceratocarcinus dilatatus, A. Milne Edwards. New Caledonia. (This species is nearly allied to and may be a variety of *Ceratocarcinus longimanus*).
Ceratocarcinus spinosus, Miers. Oriental Seas.

Ceratocarcinus longimanus, Adams and White.

Ceratocarcinus longimanus, Adams and White, Proc. Zool. Soc. Lond., p. 57, 1847; Crust. in Zool. H.M.S. "Samarang," p. 34, pl. vi. fig. 6, 1848.

Arrou (Aröe) Islands, September 18, 1874 (an adult male).

This specimen has the rostral and lateral spines longer, and the prominences of the dorsal surface of the carapace more developed than in White's figure, or in a specimen bearing his name in the collection of the British Museum from Borneo. In these characters it more nearly approaches *Ceratocarcinus dilatatus*, A. Milne Edwards,[1] from New Caledonia, which indeed is only distinguishable by its broader carapace, and may perhaps be regarded as a variety of *Ceratocarcinus longimanus*.

The dimensions of the Challenger specimen are as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace,	2	4·5
Length of a rostral spine, about	1	2·5
Breadth of carapace to base of lateral spine,	2	4·5
Length of a chelipede, about	6	12·5
Length of first ambulatory leg, nearly	6	12·

Ceratocarcinus speciosus, Dana.[2]

This is another nearly allied species, but is apparently well distinguished by its much broader front and distinctly spinulose chelipedes.

[1] *Nouv. Archiv. Mus. Hist. Nat.*, vol. viii, p. 256, pl. xiv. fig. *a*, 1872.
[2] Crust. in U.S. Explor. Exped., vol. xiii. p. 139, pl. vi. fig. 8, 1852.

CYCLOMETOPA or CANCROIDEA.

Cyclométopes, Milne Edwards (pt.), Hist. Nat. Crust., vol. i. pp. 264, 363, 1834.
Cancroidea, Dana (pt.), U.S. Explor. Exped., vol. xiii., Crust. 1, pp. 67, 142, 1852.
Cyclometopa, Miers, Cat. New Zeal. Crust., p. 13, 1876.

Carapace usually transverse, wide in front, with the antero-lateral margins regularly arcuated; more rarely quadrate or suborbicular, but not rostrated. Epistoma short, transverse. Antennules usually transversely plicated. The exterior maxillipedes, the afferent channels to the branchiæ, the branchiæ, and the verges of the male are as in the Oxyrhyncha.

Legion I. CANCRINEA or CANCROIDEA TYPICA.

Cancrinea or *Cancroidea typica*, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 145, 1852.

This section, in Dana's system, includes the whole of the typical Cyclometopa (Cancridæ or Portunidæ), which have almost invariably a littoral or marine habitat, and in which, therefore, the carapace is not antero-laterally convex and largely developed so as to constitute a vaulted respiratory chamber, as in certain Thelphusidæ, which may remain for extended periods out of the water. The buccal cavity is usually well defined, and the flagella of the antennæ are not greatly elongated as in those degraded forms (Corystoidea) which approach the *Anomura*. The dactyli of the ambulatory legs are styliform and unarmed, or in the fifth pair expanded into an ovate natatory organ; they are rarely, if ever, armed with longitudinally seriate spinules as in those forms (Thelphusidæ) which approach the Catometopa.

Family 1. CANCRIDÆ.

Cancériens, Milne Edwards (tribe), Hist. Nat. Crust., vol. i. p. 368, 1834.
„ A. Milne Edwards (family), Ann. d. Sci. Nat., ser. 4, vol. xviii. p. 41, 1841; Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 179, 1865.
Cancridæ and *Eriphidæ*, Dana, U.S. Explor. Exped., vol. xiii., Crust. I, pp. 145, 147, 228, 1852.

Carapace, at least in the recent genera, transverse, usually convex, with the antero-lateral margins more or less arcuated, rarely subquadrate. Ambulatory legs all gressorial, with styliform dactyli; species marine or littoral.

The genus *Œthra* (the type of the section *Cancériens cryptopodes*, Milne Edwards) is excluded, as being somewhat more nearly related to the Parthenopidæ.[1]

[1] Miers, *Journ. Linn. Soc. Lond.* (Zool.), vol. xiv. p. 669, 1879.

The genera comprised in the true Cancroid Cyclometopa are now extremely numerous, and, as is well known, are connected by almost insensible gradations of form and structure. Hence it is difficult, if not impossible, to indicate a system of classification whereby they may be divided into groups at once natural and distinctly defined; and the types represented in the Challenger collection are not sufficiently numerous to permit me to attempt (even did time and experience allow) a new and detailed arrangement of the genera of this group.

The classification of Professor J. D. Dana,[1] although somewhat artificial, is one which is certainly very convenient to systematists, since this author gives a synoptical arrangement, with diagnostic characters, of all the genera known at the time when his work was published, and as it is the one which I have hitherto followed in my own papers, I have thought it best, pending a complete revision of this group, to adhere to this arrangement so far as the sequence of the leading genera is concerned in the present Report, separating merely the somewhat abnormal genus *Trapezia* (which approaches the Catometopa in the form of the carapace) from the remainder of the group; but I refrain from indicating in the present imperfect state of our knowledge any subdivisional characters or subfamilies.

A widely different and in some particulars more natural arrangement has been indicated by A. Milne Edwards,[2] who divides the true Cancridæ into five primary, two transitional, and two accessory groups, characterised mainly by the form of the carapace, and typified respectively by the genera *Cancer*, *Carpilius*, *Xantho*, *Eriphia* and *Trapezia*, and by *Œthra* and *Galene*, and *Pirimela* and *Liagore*. His monograph of the recent genera of Cancridæ has, however, unfortunately never been completed, and the limits and subdivisional characters of six of the groups have not been defined, but it is probable that the true natural arrangement of the genera lies in the direction indicated by Milne Edwards. The genus *Œthra* (the type of his group Œthrides) is somewhat more nearly related to the Oxyrhyncha than to the Cyclometopa, and has been arranged, with *Cryptopodia* in the former group, both by Professor S. I. Smith and Dr. W. Stimpson, and by myself.

Section I. **Cancrinæ.**

Cancériens arqués, Milne Edwards, Hist. Nat. Crust., vol. i. pp. 369, 371, 1834.
„ *quadrilatères*, Milne Edwards (pt.), *tom. cit.*, pp. 369, 424, 1834.

Carapace usually convex, with the antero-lateral margins arcuated, and armed with several lobes, teeth or spines. The front is of moderate width and usually does not project over the antennules and bases of the antennæ, which are seldom excluded from the interior hiatus of the orbits.

[1] Crust. in U.S. Explor. Exped., vol. xiii. p. 145, 1852.
[2] *Ann. d. Sci. Nat.* (Zool.), ser. 4, vol. xviii. p. 39, 1862; *Nouv. Archiv. Mus. Hist. Nat.*, vol. i. pp. 180, 182, 1865.

The genera included in this section and represented in the Challenger collection are the following:—

A. Endostome or palate without distinct longitudinal ridges defining the openings of the efferent branchial channels (family Cancridæ, Dana).

a. Fingers of the chelipedes acute or subacute (subfamilies Cancrinæ and Xanthinæ, Dana).

Cancer, Lamarck.
Carpilius, Desmarest.
Atergatis, de Haan.
Lophactæa, A. Milne Edwards.
Lophozozymus, A. Milne Edwards.
Medæus, Dana.
Actæa, de Haan.
Atergatopsis, A. Milne Edwards
Xantho, Leach.
Xanthodes, Dana.
Panopeus, Milne Edwards.
Micropanope, Stimpson.

b. Fingers of the chelipedes more or less distinctly excavated at the tips and spoon-shaped (subfamily Chlorodiinæ, Dana).

Etisus, Milne Edwards (pt.).
Carpilodes, Dana.
Zozymus, Leach.
Actæodes, Dana.
Leptodius, A. Milne Edwards.
Phymodius, A. Milne Edwards.[1]

[1] A remarkable parallelism in structure (exhibited in the following table, which also indicates a more natural classification) exists between the genera of these two subsections. Were the types in the Challenger collection more numerous, this parallelism could be exhibited in further detail.

1. Carapace widely transverse. Antennules longitudinally or obliquely plicated. The flagella of the antennæ excluded from the orbital hiatus by the enlargement of the basal antennal joint.
Cancer, Lamarck. | *Etisus*, Milne Edwards.

2. Carapace usually moderately transverse. Antennules obliquely or transversely plicated; the flagella of the antennæ not excluded from the orbits.

a. Basal antennal joint produced within the interior hiatus of the orbit; ambulatory legs not cristated.
Carpilius, Desmarest. | *Carpilodes*, Dana.

b. Basal antennal joint not produced within the interior orbital hiatus, but in contact with the front, or with the infero-lateral frontal process.

* Ambulatory legs carinated or cristated.

Atergatis, de Haan.
Lophactæa, A. Milne Edwards.
Lophozozymus, A. Milne Edwards.
Zozymus, Leach.

** Ambulatory legs not carinated nor cristated.

Medæus, Dana.
Actæa, de Haan.
Atergatopsis, A. Milne Edwards.
Xantho, Leach.
Xanthodes, Dana.
Panopeus, Milne Edwards.
Micropanope, Stimpson.
Actæodes, Dana.
Leptodius, A. Milne Edwards.
Phymodius, A. Milne Edwards.

B. The endostome or palate with distinct longitudinal ridges defining the apertures of the efferent branchial channels (family Eriphiidæ, Dana; pt.).

a. The antennæ not excluded from the orbit:—

Eurytium, Stimpson.
Pseudozius, Dana (subgenus *Eurycozius*, n.).
Sphærozius, Stimpson.
Pilumnus, Leach.

b. The antennæ excluded from the orbit, whose interior hiatus is closed:—

Eriphia, Latrielle.

A. Endostome not longitudinally ridged (Cancridæ, Dana):—

Cancer, Lamarck.

Cancer, Lamarck, Syst. Anim. sans Vert., p. 148, 1801.
„ Leach, Trans. Linn. Soc. Lond., vol. xi p. 320, 1815.
„ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 185, 1865.

The carapace is depressed or moderately convex, very widely transverse or elliptical; its dorsal surface is smooth or uneven, with the regions very obscurely defined; its antero-lateral margins are regularly arcuated and are divided into ten lobes or teeth, which are sometimes broad, subtruncated, and little prominent, sometimes more prolonged and acute, and which may themselves be armed with accessory denticles; the postero-lateral margins are shorter than the antero-lateral margins, and defined by a raised line or crest (the postbranchial crest). The front is relatively narrow, and is divided into five lobes or teeth (if the lobes which constitute the superior and interior orbital angle be included) and projects somewhat beyond the orbits, which are small and sometimes dentated; the teeth defined by two fissures in the superior and two in the inferior margins. The post-abdomen in the male is five-jointed, with the third to the fifth joints coalescent. The eyes are small and are set on very short thick pedicels. The antennules are longitudinally or nearly longitudinally plicated. The basal antennal joint is somewhat enlarged with a distal lobe or tooth, which unites with the front so as to exclude the short flagellum from the orbit. The exterior maxillipedes have the merus-joints usually distally truncated, with the antero-external angle not produced, and they are usually more or less distinctly notched on the inner margin, but the notch is sometimes obsolete. The chelipedes are usually subequal and not very largely developed, and their palms are nearly always longitudinally costated on the exterior surface; fingers acute and dentated on the inner margins. The ambulatory legs are somewhat elongated, with the dactyli slender and nearly straight (not dilatedand flattened as in *Metacarcinus*).

To the details regarding the geographical distribution of this genus given by A. Milne Edwards I may add the following. A species, *Cancer recurvidens* (Spence Bate), occurs at Vancouver Island, which, to judge from the very short description, closely resembles, and may perhaps not be distinguishable from young specimens of *Cancer antennarius*, Stimpson, or may belong to the doubtfully distinct genus *Trichocarcinus*. A variety (*annulipes*, Miers) of *Cancer edwardsii*, Bell, occurs in Trinidad Channel, in the Straits of Magellan.[1]

The details are wanting with regard to the bathymetrical range of most of the species, but the two which inhabit the eastern coasts of North America, *Cancer irroratus*, Say, and *Cancer borealis*, Stimpson, have been shown by Professor S. J. Smith to occur at considerable depths; the former, according to Professor Smith, has been taken by Alexander Agassiz at 65 to 178 fathoms, and the latter is recorded by Smith from 373 fathoms.[2]

Cancer longipes, Bell.

Cancer longipes, Bell, Trans. Zool. Soc. Lond., vol. i. p. 337, pl. xliii., 1835.
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 199, 1865, and references to literature.

Two females were collected on the shore at Valparaiso. The largest measures as follows :—

Adult ♀.	Lines.	Millims.
Length of carapace,	27½	58·5
Breadth of carapace,	42½	90
Length of left chelipede,	35½	75
Length of first ambulatory leg, about	40	85

The right chelipede in this specimen is small, having evidently been lost and renewed from the coxal joint of the original limb.

Carpilius, Leach.

Carpilius, Leach (MSS. ?).
„ Desmarest, Consid. gén. sur la classe des Crust., footnote, p. 104, 1825.
„ Milne Edwards, (pt.), Hist. Nat. Crust., vol. i. p. 380, 1834.
„ A. Milne Edwards, (pt.), Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 212, 1865.

Carapace very convex, without dorsal tubercles or sulci defining the regions; with the antero-lateral margins regularly arcuated and entire, terminating in a blunt lobe or tooth (the lateral epibranchial tooth) and slightly longer than the postero-lateral margins, which are nearly straight. The front is rather narrow, deflexed, and is divided into

[1] *Proc. Zool. Soc. Lond.*, p. 67, 1881.
[2] Report by U.S. Fish and Fisheries Commission for 1882, p. 343, 1884.

three lobes, the median being prominent, with the anterior margin slightly concave, and the lateral ones rounded and but little developed (or not at all in young examples). The orbits are small, without marginal fissures, and with a rounded lobe or tooth at their exterior angle. The post-abdomen of the male is six-jointed, with the third and fourth joints coalescent. The eyes are set on short thick pedicels. The basal joint of the antennæ is elongated, and enters well within the long and narrow hiatus existing between the front and the orbits, but does not reach the inner and inferior angle of the orbit, and the very small flagellum is also contained within this hiatus. The merus of the exterior maxillipedes is very obliquely truncated at the distal extremity, and not (or scarcely at all) emarginated at the antero-internal angle. The chelipedes (in the adult male) are large and massive, unequal, the palms without crests or tubercles; the fingers of the larger chelipede are armed with one or two large rounded tubercles on the inner margins. The ambulatory legs are moderately elongated, with the joints smooth. Subcylindrical or slightly compressed.

Of the three well-defined species of this genus admitted by Professor A. Milne Edwards (*tom. cit., infra*, p. 218), two are commonly and widely distributed throughout the Indo-Pacific region and one is common in the West Indies. Little has been recorded concerning their bathymetrical range.[1]

Carpilius maculatus (Linné).

Cancer maculatus, Linn., Mus. Lud. Ulrici, p. 433, 1764; Syst. Nat., ed. 12, p. 1042, 1766.
Carpilius maculatus, Milne Edwards, Hist. Nat. Crust. vol. i. p. 382, 1834; Atlas des Crust. in Règne Animal de Cuvier, pl. xi. fig. 2.
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 214, 1865, where references to literature are given.

Honolulu, on the reefs (an adult male).

Adult ♂.	Lines.	Millims.
Length of carapace,	31½	67
Breadth of carapace,	42	89·5

Atergatis, de Haan.

Atergatis, de Haan, (subgenus) Crust. in Siebold, Fauna Japonica, dec. i. p. 17, 1833.
„ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 234, 1865, and synonyma.

This genus somewhat resembles *Carpilius* in the smooth, convex carapace, whose regions are but faintly indicated, (if at all) but it is distinguished by the following characters:—The carapace is usually more transverse and the front less prominent; the antero-lateral margins are defined by a continuous or nearly continuous carina, which, as

[1] *Carpilius lividus*, Gibbes, is probably, as stated by A. Milne Edwards, founded on a young specimen of *Carpilius convexus* (Forskål). *Carpilius prætermissus*, Gibbes, is probably, as I have noted (*Ann. and Mag. Nat. Hist.*, ser. 5, vol. ii. p. 407, 1878), identical with *Liagore rubromaculata*, de Haan.

well as the orbital margins, may, however, be interrupted by very minute notches or fissures; the lobe at the exterior orbital angle, and ordinarily the lateral epibranchial lobe, are not developed. The post-abdomen in the male is usually five-jointed, with the third and fourth, and the fifth and sixth segments coalescent. The basal joint of the antennæ is shorter and attains the infero-lateral process of the front, but is not prolonged within the orbital hiatus. The merus of the exterior maxillipedes is much less obliquely truncated at the distal extremity. The chelipedes of the adult males are less massive, and usually subequal. The fourth to the sixth joints of the ambulatory legs are not merely compressed, but somewhat dilated, and carinated.

The species are rather numerous and occur throughout the Indo-Pacific region, in shallow water and on the shore. The sole representative of this genus in the Challenger collection is the *Atergatis floridus* of Linné, which is the longest known, commonest, and most widely distributed member of the genus.

To the species enumerated by A. Milne Edwards, I may add the following:—

Atergatis asperimanus, White = *Atergatis insularis*, Adams and White. Philippines.[1]

Atergatis montrouzieri, A. Milne Edwards. New Caledonia. This species is perhaps identical with *Atergatis asperimanus*.

Atergatis roseus, var. *alba* (*sic.*), Kossmann. Red Sea.

This author regards *Atergatis marginatus*, de Haan, *Atergatis scrobiculatus*, Heller, *Atergatis lævigatus*, A. Milne Edwards, and *Atergatis nitidus*, A. Milne Edwards, as mere varieties of *Atergatis roseus*.

Atergatis floridus (Linné).

Cancer floridus, Linn., Syst. Nat., ed. 12, p. 1041, 1766.
Cancer seyröe, Herbst, Naturgesch. der Krabben u. Krebse, vol. iii. p. 20, pl. liv. fig. 2, 1801.
,, ,, Milne Edwards, Hist. Nat. Crust., vol. i. p. 375, 1834.
Atergatis floridus, de Haan, Crust. in Siebold, Fauna Japonica, pp. 17, 46, 1835.
,, ,, Dana, Crust. in U.S. Expl. Exped., vol. xiii. p. 159, pl. vii. fig. 4, 1852.
? *Atergatis compressipes*, MacLeay, Annulosa, in Smith, Zool. S. Africa, p. 59, 1849.

Ternate (an adult male and female); Zebu, on the reef (an adult male).

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	14	29·5
Breadth of carapace,	20	42

[1] In the lobulated dorsal surface of the carapace this species approaches *Lophozozymus*, but as the antero-lateral margins are entire, I refer it to *Atergatis*. It has been considered by A. Milne Edwards to be synonymous with *Lophozozymus radiatus*, Milne Edwards, but it differs from Milne Edwards' description of *Lophozozymus radiatus* both as regards the antero-lateral margins and the chelipedes. In the *Ann. and Mag. Nat. Hist.* ser. 5, vol. viii. p. 204, 1881, I erroneously referred to *Atergatis lateralis*, White, as being regarded by A. Milne Edwards as synonymous with *Lophozozymus radiatus*.

Lophactæa, A. Milne Edwards.

Lophactæa, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, Zool., vol. xviii. p. 43, 1862; Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 245, 1865.

Carapace transverse, convex, its dorsal surface very distinctly lobulated in its anterior half, and often granulated. The antero-lateral margins are longer than the concave postero-lateral margins, and not dentated as in *Lophozozymus*, but defined by a carina or crest, which is more or less distinctly interrupted by narrow fissures. The cervical suture and the depressions between the lobules of the dorsal surface are usually distinct and smooth. The front is deflexed, not very prominent, and is rough, usually about one-third the width of the carapace; its anterior margin is sinuated and nearly straight, with usually a narrow median fissure. The post-abdomen in the male is usually five-jointed, with the third to the fifth segments coalescent. The eyes, antennæ, and exterior maxillipedes differ in no essential particular from the same parts in *Atergatis*. The chelipedes (in the adult male) are moderately robust and subequal; the merus-joint very short, carpus and palm smooth or granulated on the upper surface, palm sometimes carinated above, dactyli usually carinated on the superior margins. The ambulatory legs are short, laterally compressed; the fourth to the sixth joints dilated and carinated on the superior margins; dactyli slender, nearly straight, and usually longer than the penultimate joints.

This genus can only be distinguished from *Atergatis* by the lobulated carapace, and from *Lophozozymus* by the absence of antero-lateral marginal teeth.

The species occur in the Indo-Pacific region, one (*Lophactæa lobata*) also in the West Indian Seas and Gulf of Mexico, and at Bermuda; one (*Lophactæa picta*) at the Cape Verde Islands, St. Lucia, and Salamanca, and one (*Lophactæa rotundata*) at Cape St. Lucas, California (*cf.* A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, pp. 242, 243, 1879, for synonyma).

The following have been described since Milne Edwards' Monograph was published in 1865:—

Lophactæa picta, A. Milne Edwards. St. Lucia; Salamanca.
Lophactæa violacea, A. Milne Edwards. New Caledonia.
Lophactæa helleri, Kossmann. Red Sea.

Lophactæa lobata, A. Milne Edwards.

? *Cancer spectabilis*, Herbst, Naturgesch. der Krabben u. Krebse, vol. ii. Heft. v. p. 153, pl. xxxvii. fig. 5, 1794.
„ *lobatus*, Milne Edwards, Hist. Nat. Crust., vol. i. p. 375, 1834.
Lophactæa lobata, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 249, pl. xvi. fig. 3, 1865; Crust. in Miss. Sci. au Méxique, pt. 5, p. 242, 1879, et synonyma.

Bermuda, on the shore (an adult male and two females, whereof one bears ova).

In no two of the specimens of this species is the pattern defined by the coloured lines

on the dorsal surface of the carapace exactly alike. The colour (in spirit-specimens) is the reverse of that mentioned by A. Milne Edwards in his latest description of this species, the blotches upon the carapace being of a yellowish hue, and the narrow lines defining them of a crimson red, as in the description and figure of Herbst's *Cancer spectabilis*, which very probably represents *Lophactæa lobatus*, but as Herbst was ignorant of the locality of his types, and both description and figure are very insufficient, I follow Professor A. Milne Edwards in retaining for this species the name by which it has been generally known.

The adult male has the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace,	7½	16
Breadth of carapace, about	10½	22·5

Lophactæa granulosa, (Rüppell).

Xantho granulosus, Rüppell, Beschreib. 24 kurzschwanzigen Krabben des rothen Meeres, p. 24, pl. v. fig. 3, 1830.

Lophactæa granulosa, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 247, 1865; vol. ix. p. 187, 1873, et synonyma.

Honolulu, on the reefs (an adult female).

Adult ♀.	Lines.	Millims.
Length of carapace,	8½	18
Breadth of carapace,	12½	26

Lophozozymus, A. Milne Edwards.

Lophozozymus, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, vol. xx. p. 276, 1863; Ann. Soc. Entom. France, ser. 4, vol. vii. p. 272, 1867.

The carapace is broader than long, lobulated near the antero-lateral margins, depressed or moderately convex; its antero-lateral margins are distinctly dentated, but occasionally (subgenus *Lophoxanthus*) the first and second antero-lateral marginal teeth are not developed. The front projects but little, and is divided by a small median notch into two broad and truncated lobes. The orbits are nearly circular, and marked with fissures which are closed, or even obsolete. The post-abdomen in the male is five- to seven-jointed (the third to the fifth segments frequently coalescent). The eyes are set on short, thick peduncles. The basal joint of the antennæ is in contact with the infero-lateral process of the front, but does not enter the interior subocular hiatus. The exterior maxillipedes are of the normal form, nearly quadrate, and distally truncated, with the antero-external angle not produced and the antero-internal angle very slightly (if at all) emarginate; exognath of moderate width. The chelipedes (in the adult male) are moderately developed, with the merus-joint short, trigonous; wrist not carinated

above, but toothed on the inner margin; palm slightly compressed and often carinated above; fingers toothed on the inner margins. The ambulatory legs are of moderate length, compressed, with the merus, carpus, and penultimate joint carinated on the superior margins.

The species are widely distributed throughout the Oriental region, and occur also on the Californian coasts, and except the type *Lophozozymus epheliticus* (Linn.), are of rather small size. I have described a species, *Lophozozymus* (*Lophoxanthus*) *sexdentatus*, from the Senegambian coast.

The single species in the Challenger collection is to be referred to the subgenus *Lophoxanthus*,[1] which is apparently distinguished from the typical *Lophozozymus* merely by the less transverse and generally more depressed carapace, and by the obsolescence of the first and second teeth of the antero-lateral margins, and passes by almost insensible gradations into the typical form, and to which the following species and varieties have been referred :—

Lophoxanthus lamellipes (Stimpson). California and West Coast of Mexico.
Lophoxanthus bellus (Stimpson) = *Xanthodes leucomanus*, Lockington, and *Xanthodes hemphilli*, Lockington (vars.). California and Japan (50 fathoms).
Lophoxanthus sexdentatus, Miers. Goree Island, Senegambia (9 to 15 fathoms).

Lophozozymus (*Lophoxanthus*) *bellus*, Stimpson, var. *leucomanus*, Lockington (Pl. XI. fig. 1).

Xanthodes leucomanus, Lockington, Proc. Calif. Acad. Nat. Sci., pp. 32, 100, 1876.

The carapace is transverse, nearly flat and plane, except behind the front and the first antero-lateral marginal teeth, where it is rugose and granulated; the rugosities exist also on the front of the gastric and branchial regions; the cervical suture and the sutures of the frontal, gastric and branchial regions are distinct; the frontal margin is nearly straight, with a median notch. Of the antero-lateral teeth, only the three posterior are distinctly developed; these are triangulate and moderately prominent; in front of the first of these is the rudiment of another tooth. The pterygostomian regions are granulated; the sternal surface is nearly smooth. Only five of the post-abdominal segments are distinct (the third and fourth, and the fifth and sixth, are coalescent), the terminal segment is slightly transverse and distally rounded. The basal antennal joint reaches to the infero-lateral frontal process, but not to the apex of the inner subocular angle of the orbit. The outer maxillipedes present nothing remarkable; their narrow exognath reaches to the antero-external angle of the distally truncated merus-joint. The chelipedes are moderately large and robust (either the right or left is the larger). The upper margins of their short and trigonous merus-joints are armed with a series of

[1] *Lophoxanthus*, A. Milne Edwards (genus), Crust. in Miss. Sci. au Méxique, pt. 5, p. 256, 1879.

granules, the carpus and palm are rugose and pitted above, the dorsal surface thus appearing reticulated, the pits on the upper surface of the palms disposed in longitudinal series; the palm of the smaller chelipede is strongly granulated on its outer surface and is longitudinally bisulcated; these sulci are discernible (but less distinctly) on the larger chelipede; the fingers are deep brown, denticulated on their inner margins and with the acute apices slightly decussate; the mobile finger is longitudinally carinated and sulcated above. The ambulatory legs have the merus, carpus, and penultimate joints compressed and more or less distinctly carinated, the carinæ strongest on the upper margins of the merus-joints; dactyli slender and closely pubescent. Colour (in spirit) yellowish-brown.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	4	8
Breadth of carapace,	5½	11
Length of larger chelipede, nearly	6	12
Length of second ambulatory leg,	6	12

Several specimens of both sexes were collected in the Japanese Sea, in 50 fathoms, lat. 34° 38′ 0″ N., long. 135° 1′ 0″ E. (Station 233A).[1]

Medæus, Dana.

Medæus, Dana, Amer. Journ. Sci. and Arts, ser. 2, vol. xi. p. 125, 1851; U.S. Explor. Exped., vol. xiii., Crust. I, pp. 149, 181, 1852.

The carapace is moderately transverse and convex, with the surface more or less distinctly lobulated or granulated, and the antero-lateral margins armed with from three to five distinct teeth; the front projects slightly beyond the orbits, and is usually divided into two lobes by a median notch. The antero-lateral margins are continued, in the typical species, *Medæus ornatus*, beneath the inferior margin of the orbit as a denticulated crest, which, however, is obsolete in other species which have been referred to this genus. The eyes and orbits are small and nearly as in *Xantho*. The post-abdomen in the male is five-jointed, with the third to the fifth joints coalescent. The basal antennal joint attains the infero-lateral process of the front, or even, in some species, enters very slightly within the inner orbital hiatus. The exterior maxillipedes present nothing remarkable, being distally truncated and very slightly emarginate at the antero-internal angle. The chelipedes are moderately developed and the palms are usually tuberculated

[1] These specimens are rather doubtfully referred to this variety, originally described from Californian types, on account of the brevity of Lockington's description, but they agree with it in that which seems to be the principal characteristic of this variety, *i.e.*, in the pitted carpus and palm of the chelipedes, which present somewhat the appearance of being covered above with a network of raised lines; the dactyli, however, are dull, not specially leucous. Mr. Lockington, in a MS. note in the copy of his paper sent by him to the author, admits the specific identity both of *Xanthodes leucomanus* and *Xanthodes hemphilli* with *Lophoxanthus bellus*. A specimen, sent by Mr. Lockington as "*Xanthodes hemphilliana*," in the collection of the British Museum, also apparently belongs to the variety *leucomanus* (*cf.*, his remarks on *Xanthodes hemphilliana*, *tom. cit.*, p. 100).

on the upper surface; fingers dentated on the inner margins and distally acute. The ambulatory legs are rather slender and the merus-joints are usually, but not invariably, spinuliferous or denticulated above.

This genus is very nearly allied to *Halimede* (de Haan), but is distinguished, as M. A. Milne Edwards has noted, by the coalescence of the third to the fifth post-abdominal segments.

The following species have been referred to this genus:—

Medæus ornatus, Dana. Hawaiian Islands.
Medæus elegans, A. Milne Edwards. New Caledonia.
Medæus nodosus, A. Milne Edwards. New Caledonia and Lifou Islands.
Medæus spinimanus (Milne Edwards) = *Cancer miniatus*, Desbonne and Schramm, *fide*, A. Milne Edwards. Guadeloupe.
Medæus haswelli, n. sp. Australia, Twofold Bay, 150 fathoms.
Medæus simplex, A. Milne Edwards. Madagascar and Samoa Islands (Upolu).

Medæus haswelli, n. sp. (Pl. XI. fig. 2).

The carapace is slightly transverse, rather flat, with the sutures defining the various regions of the dorsal surface very distinct; the body is everywhere very distinctly and evenly granulated; the granules of the dorsal surface somewhat larger and less crowded than those of the inferior surface of the body. The antero-lateral margins of the carapace are somewhat shorter than the postero-lateral margins. The front is rather broad and but little prominent; its anterior margin is obscurely sulcated longitudinally and divided into two lobes by a slight median notch; the antero-lateral margins of the carapace bear only three triangular teeth, the first of which is placed at some distance from the exterior orbital angle, and the second rather nearer to the third than to the first tooth. The infra-orbital prolongations of the antero-lateral margins, characteristic of the type of the genus (*Medæus ornatus*) are here indicated merely by a very obscure line of granules, reaching from the first of the antero-lateral teeth to a point just beneath the exterior angle of the orbit. The orbits are oval, with a moderately prominent inner suborbital lobe and a slightly indicated notch at the outer angle, and another in the middle of the superior margin. The post-abdomen in the male is five-jointed (as in the type), with the third to the fifth joints coalescent, and the terminal joint transverse and semicircularly rounded. The antennæ and maxillipedes present nothing remarkable; the basal antennal joint reaches to the infero-lateral frontal process, and the exognath of the outer maxillipedes attains the antero-external angle of the distally truncated merus-joint. The chelipedes are moderately robust for so small a species, the joints granulated much more distinctly on the outer than on the inner surface; the merus-joint has a series of larger granules on its upper margin, and the carpus a spiniform tooth on its inner surface; the palm of the

larger chelipede is much more distinctly granulated on and near the upper margin and at the base than elsewhere; the fingers are regularly denticulated on the inner margins and acute at the tips, and the dactylus sulcated above. The smaller chelipede is externally more strongly granulated, with relatively longer and more slender fingers; the ambulatory legs (of the second pair) are slender, with the merus, carpus, and penultimate joints denticulated on their upper margins, and the dactyli styliform, straight. Colour (in spirit) yellowish-brown; the fingers of the chelipedes are chocolate-brown, the coloration not extending over the palmar surface.

Adult ♂.	Lines.	Millims.
Length of carapace, about	3	6
Breadth of carapace, about	4	8·5
Length of larger chelipede, nearly	5	10

Two males and a female were trawled off Twofold Bay in 150 fathoms (Station 163A). All are very small in size, yet the male, from which the description is mainly taken, is apparently adult. The ambulatory legs are deficient, except in one specimen, where only one leg is perfect.

The characteristic disposition of the sulci of the carapace may be better understood by a reference to the figure than by any detailed description.

The nearest ally of this species is perhaps *Medæus elegans*, A. Milne Edwards, from New Caledonia,[1] in which, to judge from the figure, the areolation of the carapace is different and the antero-lateral margins of the carapace longer; in *Medæus granulatus* the small intermediary spines and tubercles of the antero-lateral margins, characteristic of *Medæus elegans*, do not exist. The granulated (not cristiform or nodose) palms of the chelipedes further distinguish *Medæus granulatus* from all the species known to me.[2]

Actæa, de Haan.

Actæa, de Haan, Crust. in Siebold, Fauna Japonica, dec. i. p. 18, 1833.
,, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 148, 1852.
,, A. Milne Edwards (pt.), Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 259, 1865.
Euxanthodes, Paulson, 1875, *fide* Kossmann.
Psaumis, Kossmann, Crust. in Zool. Ergeb. einer Reise Küstengeb. d. rothen Meeres, Malacostraca, p. 26, 1877.[3]

The carapace is transverse and moderately convex and is usually very distinctly lobulated on the dorsal surface; the lobules usually granulated, with the intervening

[1] *Nouv. Archiv. Mus. Hist. Nat.*, vol. ix. p. 211, pl. viii. fig. 1, 1873.

[2] This species also bears some external resemblance to the Australian form I have recently described as *Galene granulata*, but in *Galene granulata*, as in the typical *Galene bispinosus* (Herbst), the basal antennal joint does not reach the subfrontal process. Neither in the species of *Galene* nor in *Medæus haswelli* are ridges developed on the endostome or palate.

[3] The genus *Banarcia*, A. Milne Edwards, may perhaps not be distinct from *Actæa*; I have, however, referred a species to this genus in the Report on the Crustacea of H.M.S. "Alert," p. 210, pl. xix. fig. c, 1884, *vide* A. Milne Edwards, *Ann. Soc. Entom. France*, ser. 4, vol. ix. p. 167, 1869.

sutures very distinct. The front is bilobate or indistinctly quadrilobate, the antero-lateral margins are regularly arcuated and divided into lobes which are rounded and often obscurely defined. The orbits are small and are usually marked with two or three closed fissures. The post-abdomen in the male is five- to seven-jointed. The eyes are set on short thick pedicels. The basal antennal joint is short and reaches the infero-lateral process of the front, but not the extremity of the interior suborbital lobe of the orbit (*Psaumis*, Kossmann), or more generally, enters slightly within the interior hiatus of the orbit, and then may reach the extremity of the suborbital orbital lobe; the flagellum lies within the interior orbital hiatus. The exterior maxillipedes present nothing remarkable, having the merus-joint quadrate, distally truncated, and slightly emarginate at the antero-internal angle. The chelipedes are subequal and moderately developed, with the wrist and palm usually granulated and the fingers distally acute or subacute, not excavated; the ambulatory legs are of moderate length and are usually compressed, not distinctly carinated, but the superior margins of the merus-joints are sometimes acute.

The species of this genus (even if *Actæodes* be excluded) are numerous and of small size, and are widely distributed both in the Atlantic and Oriental or Indo-Pacific regions.

The nearest ally to *Actæa* is undoubtedly *Actæodes*, Dana, which is distinguishable merely by the excavated fingers of the chelipedes, and which is united with *Actæa* by Milne Edwards and Kossmann, but in the absence of any complete revision of the numerous genera of the Cyclometopa or Cancroidea since that given by Dana, I have followed his classification, in which they are referred to distinct subfamilies.[1]

The following are species which are referable to this genus, and are either not included in Milne Edwards' monograph of the genus (*tom. cit.*), or have been described since its publication:—

Actæa peronii (Milne Edwards) = *Xantho spinosus*, Hess. Australia.
Actæa parvula (de Haan). Cape of Good Hope; Natal. This may be a species of *Actumnus*.
Actæa consobrina, A. Milne Edwards. Upolu, Samoan Islands.
Actæa margaritaria, A. Milne Edwards. Cape St. Vincent.
Actæa dovii, Stimpson. San Salvador, Panama.
Actæa hystrix, n. sp. Off Cape York.
Actæa spinifera, Kingsley. Plantation Key.
Actæa glabra (Kossmann). Red Sea.[2]

[1] If (as would probably be done in a more natural system), *Actæodes* be united with *Actæa*, then it will probably be necessary to unite also *Carpilodes* with *Liomera*, *Leptodius* with *Xantho*, *Lophozozymus* with *Zozymus*, &c.

[2] *Actæodes xantho*, Lockington, according to a MS. note in the author's copy of his paper, is synonymous with *Actæa sulcata*, Stimpson.

Actæa granulata (Audouin).

Cancer granulatus, Audouin, Explic. des Planches in Savigny, "Egypte," Crust., pl. vi. fig. 2.
„ (*Actæa*) *granulatus*, de Haan, Crust. in Siebold, Fauna Japonica, p. 18, 1835.
Actæa granulata, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 275, 1865, et synonyma.

Torres Strait, August, 1874 (an adult male).

This specimen is of a bright orange colour (in spirit).

Adult ♂.	Lines.	Millims.
Length of carapace,	4½	9·5
Breadth of carapace, about	6	13

A small female is in the collection, also obtained in the North Australian Seas, Cape York (8 fathoms, Station 186), which can hardly be determined with certainty. It is perhaps referable to *Actæa hirsutissima* (Rüppell), although distinguished from the typical condition of this species by the less distinctly granulated and areolated carapace. It has also much resemblance to *Actæa pilosa*, Stimpson, from which it is distinguished by the less acute fingers of the chelipedes, which are more regularly denticulated on the inner margins.

♂.	Lines.	Millims.
Length of carapace, rather over	5	11
Breadth of carapace,	7½	15·5

Actæa nodulosa, White.

Actæa nodulosa, White, Proc. Zool. Soc. Lond., p. 224, 1847; Crust. Zool. H.M.S. "Samarang," p. 39, pl. viii. fig. 4, 1847.
„ „ A. Milne Edwards, *tom. cit.*, p. 267, 1865.

An adult female was obtained on the reefs at Honolulu.

This specimen (in spirit) is of a bright orange-red colour, and is of larger size than either of the typical examples, from the Mauritius, in the collection of the British Museum; its dimensions are as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace, about	5½	11·5
Breadth of carapace, about	8½	18

Actæa nodulosa bears considerable external resemblance to *Actæa granulata*, from which it is at once distinguishable by the much more transverse carapace and the more prominent granulated lobes of the antero-lateral margins; the tubercles of the carapace are also granulated, and are not confluent as in *Actæa granulata*.

Actæa hystrix, n. sp. (Pl. XI. fig. 3).

The body is naked, except as regards the dactyli of the ambulatory legs, which possess a few hairs. The carapace is but slightly transverse, and its dorsal surface is everywhere covered with close-set, conical, acute granules, which are longer and more spiniform near the antero-lateral margins; the inter-regional sutures and those defining the areolets of the dorsal surface are moderately distinct; the front has its anterior margin deflexed and divided into two lobes by a median notch; the frontal lobes are rounded and granulated, with their external angles little prominent. The three posterior lobes of the antero-lateral margins are distinct, and each is armed with three or four, conical, spinuliform granules. The pterygostomian regions are very closely and finely granulated; the sternal surface of the body and the post-abdomen is coarsely punctulated. All the segments of the post-abdomen (in the female) are distinct; the terminal segment is the longest; the short eyes are closely set in the orbits, whose margins are granulated, as are also the eye-peduncles themselves, near to the corneæ. The basal antennal joint is somewhat longer than broad, and reaches to the subfrontal process, but not to the apex of the inner suborbital angle; the exognath of the outer maxillipedes reaches to the antero-external angle of the transverse, distally truncated, merus-joint. The chelipedes (in the male) are moderately robust and subequal; the merus, wrist, and palm are covered with numerous close-set, conical, acute granules, which are longer and spinuliform on the upper margins; the inner surface of these joints is granulated; the palm is but little longer than the wrist; the fingers are colourless and regularly denticulated on their inner margins; externally granulated; the dactylus has two or three spinules on its upper surface; the ambulatory legs are of moderate length, closely granulated, the granules lengthening into short spines on and near the upper margins of the merus, carpus, and penultimate joints; the dactyli are armed with a small terminal claw. Colour (in spirit) whitish.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	3	6
Breadth of carapace, nearly	4	8
Length of a chelipede, rather over	3	7
Length of second ambulatory leg,	3	7

Of this pretty little species but a single female specimen was obtained, off Cape York, in 8 fathoms, lat. 10° 30′ S., long. 142° 18′ E. (Station 186).

In many of its characters it is nearly allied to the West Indian *Actæa acantha* (Milne Edwards),[1] in which species, however, the spinules and granules of the carapace are less numerous and are interspersed with hairs, and the fingers are dark coloured.

[1] *Cf.* A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 245, pl. xliii. fig. 1, 1879.

From the Australian form, designated by White *Actæa carcharias*,[1] which is probably to be regarded merely as a marked variety of *Actæa granulata* (Audouin), it is at once distinguished by the non-punctulated carapace, the punctulated post-abdomen, which is smooth in the middle line, and the much longer spinules of the ambulatory legs; the latter character also distinguishes it from the Australian *Actæa calculosa*, Milne Edwards.

Actæa peronii (Milne Edwards).

Xantho peronii, Milne Edwards, Hist. Nat. Crust., vol. i. p. 392, 1834.
„ *spinosus*, Hess, Archiv f. Naturgesch., vol. xxxi. p. 132, pl. vi. fig. 3, 1865.
Actæa peronii, Haswell, Cat. Australian Stalk and Sessile-Eyed Crust., p. 46, 1882.

Off East Moncœur Island, Bass Strait, in 38 to 40 fathoms, Station 162 (several males and females); South Australian coast? "2 to 10 fath., April 1874" (a male).

The colour (in spirit) is pinkish or orange. In the largest examples the tubercles of the carapace and spines of the legs are very prominent, and traces of the former are discernible even on the posterior and postero-lateral parts of the carapace, which, in the smallest examples, is perfectly smooth in its posterior part.

The largest male measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace,	4	8·5
Breadth of carapace,	5½	10·5
Length of a chelipede,	5½	10·5
Length of first ambulatory leg,	5½	10·5

Actæa rufopunctata (Milne Edwards), var. *nodosa*.

Actæa nodosa, Stimpson, Ann. Lyc. Nat. Hist., New York, vol. vii. p. 203, 1862.
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 266, pl. xvii. fig. 6, 1865; Crust. in Miss. Sci. au. Méxique, pt. 5, p. 245, 1879.

Bahia, shallow water, September 1873 (an adult female).

This specimen differs in nothing from Oriental examples of *Actæa rufopunctata*, unless it be in the somewhat more closely and finely granulated prominences of the carapace, and I have observed a specimen from the Mauritius, in the collection of the British Museum, which resembles it in this respect. The carapace, although faded, yet presents distinct traces of the characteristic red colour of *Actæa rufopunctata*.[2]

Adult ♀.	Lines.	Millims.
Length of carapace, rather over	6	13
Breadth of carapace, nearly	9	18·5

[1] *Proc. Zool. Soc. Lond.*, p. 224, 1847.

[2] I have already noted the occurrence of *Actæa rufopunctata* in the Atlantic Region, *Proc. Zool. Soc. Lond.*, p. 68, 1881.

Atergatopsis, A. Milne Edwards.

Atergatopsis, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 252, 1865.

Carapace transverse, regularly convex, with the dorsal surface smooth or granulated, but not distinctly lobulated as in *Actæa*. The front (in the adult) is less than one-third the width of the carapace, its anterior margin is sinuated or indistinctly quadrilobated; the antero-lateral margins of the carapace are longer than the postero-lateral margins, regularly arcuated, neither cristated as in *Atergatis*, nor as distinctly lobated as in *Actæa*. The post-abdomen in the male is usually five-jointed, with the third to the fifth segments coalescent. The orbits, eyes, antennæ, and exterior maxillipedes are nearly as in *Actæa*; the basal antennal joint reaches the infero-lateral process of the front. The chelipedes, in the adult male, are subequal and well developed, with the carpus bluntly toothed or lobed on the inner margin; palm rounded, not cristated above; fingers lobed or toothed on the inner margin, and acute at the distal extremity. The ambulatory legs are of moderate length, with the fourth to the sixth joints usually somewhat compressed, but not greatly dilated or carinated; dactyli slender and nearly straight.

From *Actæa* this genus is distinguished by the more convex and less distinctly lobulated carapace, with sub-entire, antero-lateral margins, and from *Atergatis* by the non-carinated and non-cristated antero-lateral margins of the carapace, and joints of the ambulatory legs.

The species, which may attain a considerable size, occur throughout the Indo-Pacific region. The following species has been described since the publication of A. Milne Edwards' monograph of the genus:—

Atergatopsis amoyensis, de Haan. China, Amoy.

Atergatopsis granulatus, A. Milne Edwards.

Atergatopsis granulatus, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 255, pl. xiii. fig. 2, 1865.
„ „ Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 529, 1884.

South of New Guinea, 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (Station 188), a very small female.

In this specimen the carapace is granulated only near the front and antero-lateral margins; the chelipedes are granulated as in the adult. The cervical and other sutures of the dorsal surface of the carapace are scarcely distinguishable. The strong compressed tooth of the lower (immobile) finger or pollex is distinctly developed.

♀.	Lines.	Millims.
Length of carapace, about	3½	7
Breadth of carapace, nearly	5	10

Xantho, Leach.

Xantho, Leach, Trans. Linn. Soc. Lond., vol. xi. p. 320, 1815.
„ Milne Edwards (pt.), Hist. Nat. Crust., vol. i. p. 387, 1834.

The carapace is transverse and depressed, often nearly flat above, with the dorsal surface uneven and lobulated, at least near the front and antero-lateral margins. The front projects but slightly beyond the level of the orbits and is usually divided by a very small median notch; the antero-lateral margins are regularly arcuated and are divided in the typical species into four or five dentiform lobes, which are not mere rounded prominences as in *Actæa*, and are not produced and spiniform; in other species the marginal teeth are irregular, the orbits are small, and their margins usually bear indications of two or three closed fissures. The post-abdomen, in the male, is from five- to seven-jointed. The eyes are set on short thick pedicels. The basal antennal joint reaches the infero-lateral frontal process, and the flagellum lies within the interior orbital hiatus. The exterior maxillipedes present nothing remarkable, having the merus-joint distally truncated and usually slightly emarginate at the antero-internal angle. The chelipedes (in the typical species) are often considerably developed in the male, usually unequal, with the palms but slightly compressed, rounded above, and the fingers dentated on the inner margins. The ambulatory legs are of moderate length, and their joints are neither carinated nor spinose.

The species are somewhat numerous and never attain a very large size; they occur commonly on the coasts or islands both of the Atlantic and Indo-Pacific regions, or in shallow water. The Challenger collection contains but a single representative of this genus.

The following species are apparently referable to this genus as defined above, and as restricted by A. Milne Edwards. It is connected by almost insensible gradations on the one hand with *Lophoxanthus* and *Xanthodes*, on the other with *Panopeus* and *Eurypanopeus*.

I. Carapace transverse, the front not very prominent; the antero-lateral margins normally toothed, the teeth not rounded (typical species of the genus).

The genus should perhaps be restricted to include only the species of this section.

Xantho floridus (Mont.) = *Cancer poressa*, Olivi (?), *Cancer incisus*, Leach. Shores of Europe (70 to 75 metres, A. Milne Edwards).

Xantho rivalosus, Risso = *Cancer hydrophilus*, Herbst (?), Europe, northward to Shetlands and Scandinavia, 15 to 40 fathoms (Heller).

Xantho tuberculatus, Bell. Mediterranean and South British Coasts.

Xantho minor, Dana. Madeira or Cape Verde Islands.

Xantho pilipes, A. Milne Edwards. Senegal; Senegambia, Goree Island, 9 to 15 fathoms.

Xantho impressus (Lamarck). Indo-Pacific Region (Mauritius to New Caledonia).

Xantho hirtipes, Milne Edwards. Red Sea.

Xantho truncatus, de Haan. Japan. In this species the front is somewhat prominent.

Xantho arcuatus, Heller. Tahiti. The basal antennal joint is somewhat elongated and surpasses the infero-lateral frontal process.

Xantho macgillivrayi, Miers. North-East Australia.

Xantho crenatus, Milne Edwards. Peru.

Xantho bidentatus, A. Milne Edwards. Sandwich Islands; Philippines, Samboangan; Samoan Islands (Coll. Brit. Mus.). In this species, only the two posterior teeth of the antero-lateral margins are distinctly developed, but the lobes are dentiform or tuberculiform.

II. Carapace very transverse, with the two or three posterior lobes of the antero-lateral margins developed, the lobes rounded (*Liomera* (pt.), A. Milne Edwards).

This section includes such species of *Liomera* as differ from the typical *Liomera lata*, as figured by Dana (which is regarded by A. Milne Edwards as the young of *Carpilodes cinctimanus*) in having a shorter basal antennal joint, which is not produced along the exterior margin of the infero-lateral frontal process, and in which the fingers of the chelipedes are acute and the ambulatory legs not spinuliferous.

Xantho punctatus, Milne Edwards. Indo-Pacific Region.

Xantho maculatus (Haswell). Endeavour River, North-East Australia.

Xantho granosimanus, A. Milne Edwards. New Caledonia; Seychelles (Coll. Brit. Mus.).

Xantho dispar, Dana (Rio Janeiro (?), Dana), which comes near the species of this section, is probably to be referred to *Heterozius*, A. Milne Edwards.

III. Carapace usually less transverse with the front more prominent, the denticles of the antero-lateral margins of the carapace more numerous and irregular.

Certain of the species of this section approach the genus *Paraxanthus*.

Xantho occidentalis, A. Milne Edwards. Cape St. Vincent.

Xantho denticulatus, White. West Indies; Vera Cruz; Brazil.

Xantho stimpsonii, Smith = *Xantho multidentatus*, Lockington. California, Cape St. Lucas; Mazatlan. Panama, (Coll. Brit. Mus.).

? *Xantho nudipes*, A. Milne Edwards. Indo-Pacific Region, (Seychelles and New Caledonia).

Xantho bidentatus, A. Milne Edwards (Pl. XI. fig. 4).

? *Xantho bidentatus*, A. Milne Edwards, Ann. Soc. Entom. France, ser. 4, vol. vii. p. 266, 1867.

The body and limbs are nearly naked, only the pterygostomian regions and the three last joints of the ambulatory legs being partly clothed with a very short close pubescence; the joints of the ambulatory legs also are fringed with a few longer hairs. The carapace is transverse, slightly convex, smooth and shining, and is very faintly lobulated on the postfrontal, the hepatic, and the front of the gastric and branchial regions; the cardiac and the posterior part of the branchial regions are nearly smooth, the cervical and other sutures of the anterior part of the carapace are distinct but not deep. The frontal margin is divided by a small median notch into two truncated and slightly sinuated lobes, which project slightly over the antennulary septa and beyond the inner angles of the orbits, which are not at all prominent; the orbital margins are entire, the antero-lateral margins of the carapace are rather shorter than the postero-lateral margins, and are armed only with two distinct teeth, the fourth and fifth of the normal series; in front of these, two very obscure prominences indicate the position of the second and third antero-lateral teeth. The post-abdomen, in the male, is five-jointed, the third to the fifth joints coalescent. The eyes are small; the basal joint of the antennæ is but little longer than broad, and its antero-internal angle is in contact, as is usual in the genus, with the infero-lateral process of the frontal margin; the ischium-joint of the outer maxillipedes is marked on its outer surface with a longitudinal, impressed, and slightly sinuated line; the merus-joint is somewhat transverse, slightly emarginate at its antero-internal angle; the exognath does not reach to the distal extremity of the merus-joint. The chelipedes, in the male, are smooth and polished; the merus or arm very short, trigonous; carpus with an angulated prominence on its inner surface, palm smooth, both on its outer and inner surfaces, with the upper margin rounded, its outer surface rather convex, with scattered punctulations; fingers denticulated on their inner margins and with acute apices; the ambulatory legs are relatively rather slender and compressed. Colour (in spirit) yellowish-brown; the fingers dark-brown or nearly black; the colour of the lower finger extends for a very short distance inwards over the inner and outer surfaces of the palm.

Adult ♂.	Lines.	Millims.
Length of carapace, rather over	4	9
Greatest breadth,	6	12·5
Length of larger chelipede, about	8	17
Length of second ambulatory leg, nearly	6½	14

The unique specimen (a male) was obtained on the beach at Samboangan, in the Philippines.

This species is characterised by the smooth and shining surface of the carapace, which, viewed with the microscope, is seen to be closely and minutely punctulated, by

the obsolescence of the three first teeth of the antero-lateral margins, the very obscure lobulation of the dorsal surface, and the form of the chelipedes.

In the single specimen in the Challenger collection the right chelipede is considerably the larger and more robust, but does not differ markedly in form from the smaller one.

It has much the aspect of a species of *Liomera*, but the basal antennal joint does not enter so far within the inner orbital hiatus as in the typical species of that genus. It much resembles *Xantho punctatus*, Milne Edwards, as figured by A. Milne Edwards,[1] which I formerly referred to the genus *Liomera*, but is distinguished by the more distinctly developed although not prominent teeth of the antero-lateral margins.

A. Milne Edwards' description of this species is very brief, and its identification is therefore somewhat uncertain. If the Challenger species be distinct it may be designated by the name I originally applied to it, *Xantho lævidorsalis*.

Xanthodes, Dana.

Xanthodes, Dana, Proc. Acad. Nat. Sci. Philad., p. 75, 1852; U.S. Explor. Exped., vol. xiii., Crust. 1, p. 148, 1852.

In this very doubtful genus the carapace is more convex and deflexed near the front and antero-lateral margins than in the preceding (somewhat approaching certain species of *Pilumnus*), but posteriorly depressed; the antero-lateral margins are not thin-edged or cristiform, and their teeth are tuberculiform, or even spinuliform. The basal antennal joint is short and barely reaches the infero-lateral process of the front. The post-abdomen, in the male, is five-jointed.

It includes the following species, as at present restricted:—

A. *Oriental Species.*

Xanthodes lamarckii (Milne Edwards) = *Xantho cultrimanus*, White, and *Xanthodes granosomanus*, Dana. Indo-Pacific Region.

Xanthodes nitidulus, Dana. Paumotu Archipelago; New South Wales, Port Jackson (Coll. Brit. Mus.).

Xanthodes notatus, Dana. Paumotu Archipelago; Sandwich Islands; New Caledonia.

Xanthodes depressus, White. Philippines.

Xanthodes elegans, Stimpson. Japan, Simoda.

Xanthodes pachydactylus, A. Milne Edwards. New Caledonia. This species, in the well-developed antero-lateral teeth, approaches *Xantho*.

Xanthodes scabra (Fabricius). Souda Islands; East Australia; "India-orientalis" (Fabricius).

Xanthodes atromanus, Haswell.

[1] *Nouv. Archiv. Mus. Hist. Nat.*, vol. ix. p. 199, pl. vii. fig. 6, 1873.

B. *West American Species.*

Xanthodes taylori, Stimpson = *Xanthodes spinituberculatus* (Lockington). California.

Xanthodes xantusii, Stimpson. California.

Xanthodes insculpta, Stimpson. California.

Xanthodes (?) *angustus*, Lockington. California.

C. *Atlantic Species.*

Xanthodes eriphioides, A. Milne Edwards. Cape St. Vincent.

Xanthodes melanodactylus, A. Milne Edwards. Cape St. Vincent; Cape Verde Islands and Azores (50 to 90 fathoms); Madeira, Ascension Island; Goree Island, Senegambia (Coll. Brit. Mus.).

Xanthodes rufopunctatus, A. Milne Edwards. Cape St. Vincent; Maio. (Very near the preceding.)

Xanthodes bidentatus, A. Milne Edwards. Grenada (92 fathoms). This species should, perhaps, be placed in the genus *Xantho*, and if so, a new name must be adopted for it.

Xanthodes melanodactylus, A. Milne Edwards.

Xanthodes melanodactylus, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. iv. p. 60, pl. xvii. figs. 1–3, 1868.

Numerous specimens were obtained at St. Vincent, Cape Verde Islands, and also off Fayal, in 50 to 90 fathoms, and a very small example off Gomera, Canary Islands, in 75 fathoms.

I have elsewhere remarked on the variability of the colour of this species.[1]

In nearly all of the specimens in the Challenger collection the figures are dark-coloured, and many have the carapace varied with dusky spots. In one example from St. Vincent (a male of large size) the chelipedes are rose-coloured, and the fingers a slaty-pink.

An adult male from St. Vincent has the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace,	3	6·5
Breadth of carapace, nearly	5	10

Panopeus, Milne Edwards.

Panopeus, Milne Edwards (pt.), Hist. Nat. Crust., vol. i. p. 403, 1834.
„ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 306, 1880.

Carapace transverse, depressed, shaped nearly as in *Xantho*, with the dorsal surface often marked with transverse prominences which are minutely granulated. The cervical

[1] *Ann. and Mag. Nat. Hist.*, ser. 5, vol. viii. p. 212, 1881.

and mesogastric sutures distinct. The front projects but slightly beyond the level of the orbits, and is divided by a median notch into two truncated or sinuated lobes, which are separated by another notch from the antero-internal angle of the orbit, whose margins are interrupted by fissures or notches, and there is a distinct emargination immediately below the tooth at the exterior orbital angle. The antero-lateral margins are shorter than the postero-lateral margins, and are regularly divided into five teeth, of which the first or exterior orbital tooth is united more or less completely with the next; there is often a small tubercle on the subhepatic region below the interspace, between the first and second antero-lateral teeth. The endostome or palate is not longitudinally cristated. The post-abdomen in the male is usually five-jointed, with the third to the fifth of the normal segments coalescent, and it completely covers the sternum at base. The eyes are small. The basal antennal joint reaches the infero-lateral process of the front, but not the extremity of the subocular lobe of the orbit, which is often prominent and spiniform, and the flagellum occupies the inner orbital hiatus. The merus-joint of the exterior maxillipedes is often somewhat produced at its antero-external angle. The chelipedes in the adult male are moderately developed, and are nearly as in *Xantho*. The ambulatory legs are of moderate length, with the joints neither carinated nor spinose, and the dactyli styliform and straight.

The species, which never attain a very large size, have been described by A. Milne Edwards in his work above referred to, and, so far as known, with two exceptions, inhabit the American coasts. One species, *Panopeus xanthiformis*, A. Milne Edwards, has been recorded from rather deep water (73 to 118 fathoms). Two, *Panopeus africanus*, A. Milne Edwards, and *Panopeus blanchardi*, A. Milne Edwards, occur on the West African coasts.

To the species enumerated by A. Milne Edwards I may add the following:—

? *Panopeus lævis*, Dana. Brazil (Coll. Brit. Mus.).

Panopeus packardi, Kingsley. Florida; Key-West.

Panopeus subverrucosus (*Ozius subverrucosus*, White). ? This species is represented in the British Museum Collection by a carapace only.[1]

Panopeus herbstii, var. *serratus*.

Panopeus serratus, Saussure, Rev. et Mag. Zool., ser. 2, vol. ix. p. 502, 1857; Mém. Soc. Phys. d. Genève, vol. xiv. (2), p. 432, pl. i. fig. 7, 1858.

Here is somewhat doubtfully referred a small female from Bermuda, obtained in shallow water.

In this specimen the carapace is convex, with several transverse striæ upon the

[1] The Australian *Panopeus acutidens*, Haswell, is to be referred to the genus or subgenus *Heteropanope*, Stimpson, and is perhaps identical with *Heteropanope dentatus* (Adams and White).

gastric and branchial regions; and the first and second teeth of the antero-lateral margins are less distinctly separated than in larger specimens, but in other particulars it agrees well with the description of Saussure.

♀.	Lines.	Millims.
Length of carapace, nearly	3	6
Breadth of carapace,	4	8·5

Micropanope, Stimpson.

Micropanope, Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 139, 1870.
„ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 324, 1880.

I have examined no specimens of this genus except the one in the Challenger collection, referred below to *Micropanope spinipes*, A. Milne Edwards; I must, therefore, express myself with some hesitation upon its limitation, but probably it may be conveniently restricted to those (usually deep-water) species which are enumerated and figured by A. Milne Edwards, and which are distinguished from *Panopeus* and *Eurypanopeus* by the more or less distinctly spiniform teeth of the antero-lateral margins, and by the spiniferous ambulatory legs. In the former character, and in the granulated or spinuliferous palms of the chelipedes, and in their small size, these species resemble *Pilumnus*. In the single specimen examined, there exists no ridge upon the endostome or palate.

Of these species, four, *Micropanope sculptipes*, Stimpson; *Micropanope pugilator*, A. Milne Edwards; *Micropanope pusilla*, A. Milne Edwards, and *Micropanope lobifrons*, A. Milne Edwards, have been dredged at various West-Indian localities, and in the Florida Straits, in depths varying from 15 to 170 fathoms; one species, *Micropanope spinipes*, A. Milne Edwards, occurs at the Abrolhos, Brazil, in 30 fathoms, and at Bahia, in shallow water.

Micropanope spinipes (?), A. Milne Edwards.

? *Micropanope spinipes*, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 326, pl. liv. fig. 2, 1880.

I thus designate, though with some hesitation, a male obtained at Bahia in shallow water, associated with *Pilumnus floridanus* and *Pilumnus fragosus*.

This specimen agrees in the proportions of the carapace and limbs, and particularly in the absence of granulations or spinules on the outer surface of the palms of the chelipedes, with Milne Edwards' description and figure of this species (the only one of the genus recorded from the Brazilian coast), but it is distinguished by having the first of the antero-lateral marginal teeth well developed and perfectly distinguishable from the

tooth or spine at the outer angle of the orbit, although smaller than the second antero-lateral tooth.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	3	6
Breadth of carapace, about	4	8·5
Length of a chelipede, nearly	5	10
Length of second ambulatory leg,	5½	12

Etisus, Milne Edwards.

Etisus, Milne Edwards (pt.), Hist. Nat. Crust., vol. i. p. 410, 1834.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. I, pp. 149, 183, 1852.

In this genus, which, as Dana has shown, represents in the subfamily or section Chlorodiinæ the genus *Cancer* in the Cancrinæ, the carapace is usually moderately convex, widely transverse, more or less distinctly lobulated or uneven on the dorsal surface, with the antero-lateral margins divided into from five to eight lobes, teeth or spines, between which are sometimes some smaller teeth or spines. The frontal lobes are truncated, with a median notch or closed fissure, and are separated by a wider hiatus from the interior angle of the orbit, which is usually prominent or rounded. The orbital margins have two or three marginal notches or fissures, and their inner subocular angles are dentiform or acute. The post-abdomen in the male is usually five or six-jointed, with two or three of the intermediate segments coalescent and forming a single joint. The antennules are obliquely or transversely plicated. The basal joint of the antennæ is enlarged, and is considerably produced at its extero-distal angle, so as to completely exclude the flagellum from the orbit. The ischium of the exterior maxillipedes is not produced at its antero-internal angle, the merus is scarcely, if at all, emarginate at its antero-internal angle. The chelipedes in the adult males are usually unequal and considerably developed, with the merus somewhat elongated, carpus with a strong spine or tooth on its inner margin, palm not carinated, fingers toothed or tuberculated on the inner margins and meeting only at the apices, which are strongly excavated. The ambulatory legs are of moderate length, with the joints sometimes compressed but not carinated, and often armed with spines or spinules.

The species, which often attain a considerable size, occur on the shores and islands of the Indo-Pacific region.[1]

The following are species referable to the genus *Etisus* as at present restricted :—

Etisus lævimanus, Randall, common throughout the Indo-Pacific Region, from the Red Sea and Mozambique to the Polynesian Islands: *Etisus utilis*, Jacquinot and Lucas, which occurs from Singapore eastward to New Caledonia, and at Cochin-China and the

[1] The West-Indian *Etisus occidentalis* of White (List Crust. Brit. Mus., p. 20, 1847), is not properly referable to this genus, but is synonymous with *Leptodius floridanus*, Gibbes.

Philippines; *Etisus punctatus*, Jacquinot and Lucas, from Mangareva Island; *Etisus deflexus*, Dana, from the Fijis; *Etisus dentatus*, Milne Edwards, from Natal and the Mauritius to New Caledonia and the Fijis; also perhaps *Etisus anaglyptus*, Milne Edwards, from Australia and the Philippines, and *Etisus rhynchophorus* (A. Milne Edwards), from Japan, adult examples of which are distinguished from the typical species of *Etisodes*, to which genus they are referred by A. Milne Edwards, by the broader transverse carapace and the greater dilatation of the basal antennal joint, which is not so greatly reduced at its antero-external angle as in *Etisus*.

Etisus lævimanus, Randall.

Etisus lævimanus, Randall, Journ. Acad. Nat. Sci. Philad., vol. viii. p. 115, 1839.
„ „ Dana, Crust. in U.S. Explor. Exped., vol. xiii. p. 185, pl. x. fig. 1, 1832.
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 23, 1873.
„ „ Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 217, 1884.
„ *macrodactylus*, Jacquinot and Lucas, Crust. in Voy. au Pole Sud Zool., vol. iii. p. 30, pl. ix. fig. 2, 1853.
„ *convexus*, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 31, 1858.
„ *maculatus*, Heller, Sitzungsb. math.-nat. Cl. k. Akad. Wiss. Wien, vol. xliii. (1) p. 332, 1861.
„ „ *fide* Hilgendorf, Monatsber. d. k. preuss. Akad. d. Wiss. Berlin, p. 791, 1878.

Tonga Islands, Tongatabu, on the reefs (an adult male and smaller female); Sandwich Islands, Honolulu, reefs (a male).

The colour of this species is subject to very considerable variation. The ground colour of the three specimens in the Challenger collection is yellowish-brown (in spirit), the adult male from Tongatabu has the carapace punctulated with spots of a brownish-red.

The male from Tongatabu measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace,	15	32
Breadth of carapace,	24	51

The female, which, although of small size, bears ova, as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace,	9½	20
Breadth of carapace,	14	30

Carpilodes, Dana.

Carpilodes, Dana, Amer. Journ. Sci. and Arts, ser. 2, vol. xii. p. 126, 1851; U.S. Explor. Exped., vol. xiii., Crust. 1, p. 149, 1852.
„ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat. vol. i. p. 224, 1865, et synonyma.

In this genus, which represents in the Chlorodiinæ in Dana's classification the genus *Liomera* in the Xanthinæ, the carapace is very widely transverse, longitudinally convex,

and usually (but not invariably) distinctly lobulated in its anterior half. The front is somewhat deflexed, with its anterior margin sinuated and usually with a small median notch. The antero-lateral margins are not cristated, and are divided into rounded lobes (not teeth), of which only the three posterior are usually distinct. The orbits are small, and the fissures of their upper margins very slightly marked, the interior suborbital angle is not produced. The post-abdomen of the male is usually five-jointed, with the three intermediate segments coalescent and forming a single joint. The eyes are set on short thick pedicels. The basal antennal joint is somewhat elongated, and produced along the exterior margin of the infero-lateral frontal process so as to enter partly within the interior orbital hiatus. The merus of the exterior maxillipedes is usually transverse and distally truncated. The chelipedes, in the male, are subequal and moderately developed, with the palms rounded, not carinated above, and the fingers excavated at the distal extremity. The ambulatory legs are of moderate length, with the joints (except the dactyli) slightly compressed, but not carinated; the dactyli styliform and straight.

The species of *Carpilodes* are small, and rather numerous, and, with one doubtful exception, occur in the Oriental region; but the range of two or three species extends eastwards to the West American coasts. None, I believe, have been ascertained to occur in deep water.

The following species are probably referable to this genus, as I have characterised it above, besides the species enumerated by A. Milne Edwards in 1865. They were either referred by him to *Actæa* and to *Liomera*, or have been described since that date:—

Carpilodes cinctimanus (Adams and White). Indo-Pacific Region, eastwards to the west coast of North America.

? *Carpilodes longimanus* (A. Milne Edwards) = *Cancer nigerrimus*, Desbonne and Schramm. West Indies.

Carpilodes monticulosus, A. Milne Edwards. New Caledonia.

Carpilodes margaritatus, A. Milne Edwards. New Caledonia.

Carpilodes edwardsii, Kossmann. Red Sea.

Carpilodes granulosus, Haswell. Torres Strait.

Carpilodes bellus (Dana). Samoa Islands; Paumotu; Philippines.

? *Carpilodes dia* (White) = *Actæodes cavipes*, Dana (?). Philippines; Polynesian Islands. In this species the basal antennal joint enters the interior orbital hiatus as in the typical *Carpilodes*, but the species is distinguished by the peculiar lunate crests of the ambulatory legs. It should, perhaps, be separated as a distinct genus.

Carpilodes bellus (Dana).

Actæodes bellus, Dana, Proc. Acad. Nat. Sci. Philad., p. 78, 1852; U.S. Explor. Exped., vol. xiii., Crust. 1, p. 196, pl. xi. fig. 2, 1852.
Actæa bella, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 261, 1865.

Philippines, Samboangan, beach. A small male.

In the specimen referred to this species (which agrees very well with the description and figure of Dana) the basal joint of the antennæ is produced a little within the hiatus, between the inner subocular lobe of the orbit and the lateral subfrontal process, it is therefore referred to *Carpilodes* rather than to *Actæodes*, with the species of which genus it altogether corresponds in external appearance.

In the structure of the antennæ this specimen agrees with examples referred to *Carpilodes bellus* from the Samoa and Keeling or Cocos Islands, in the collection of the British (Natural History) Museum.

Adult ♂.	Lines.	Millims.
Length of carapace, ...	3	6·5
Breadth of carapace, about	4½	9·5

Zozymus, Leach.

Zosimus, Leach, Dict. d. Sci. Nat., vol. xii. p. 75, 1818.
Zozymus, Milne Edwards (pt.) Hist. Nat. Crust., vol. i. p. 383, 1834.

This genus represents in the section or subfamily Chlorodiinæ, Dana, the genus *Lophozozymus* in the Xanthinæ; it can in fact only be distinguished from *Lophozozymus* by the excavated finger tips of the chelipedes, and by the more numerous and uniform bosses or lobules of the carapace and exterior surface of the carpus and wrist of the chelipedes.

The species, as at present restricted, are few in number, and inhabit the Indo-Pacific region; they are *Zozymus æneus* (Linné), common throughout the Indo-Pacific region, from the Red Sea and Mauritius to the Polynesian Islands; *Zozymus gemmula*, Dana, from Sooloo, with which *Zozymus pilosus*, A. Milne Edwards, from New Caledonia, is perhaps identical, and which is distinguished by the somewhat granulated tubercles of the carapace, and the non-carinated palms of the chelipedes; *Zozymus pumilus*, Jacquinot and Lucas, from the Marianna Islands.[1]

Zozymus æneus (Linné).

Cancer æneus, Linné, Mus. Lud. Ulrici, p. 451, 1764; Syst. Nat., ed. 12, p. 1048, 1766.
Zozymus æneus, Milne Edwards, Hist. Nat. Crust., vol. i. p. 385, 1834, et synonyma.
„ „ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 192, pl. x. fig. 3, 1852.

Kandavu, Fiji Islands, on the reefs (two adult males).

Adult ♂.	Lines.	Millims.
Length of carapace, ...	24½	52
Breadth of carapace to base, about	34	72·5

[1] *Zozymus lævis*, Dana, from Balabac Passage, probably does not belong to this genus.

Actæodes, Dana.

Actæodes, Dana, Amer. Journ. Sci. and Arts., ser. 2, vol. xii. p. 126, 1851; U.S. Explor. Exped., vol. xiii., Crust. 1, p. 149, 1852.

The genus *Actæodes*, which is not sustained by A. Milne Edwards and by some other authors, in Dana's system represents in the Chlorodiinæ the genus *Actæa* in the Xanthinæ, which it resembles in the transverse and distinctly lobulated carapace and in the rounded lobes of the antero-lateral margins, also in the structure of the orbits, antennæ, maxillipedes, and in other essential characters; it is, in fact, only distinguished from *Actæa* by the structure of the chelipedes, whose fingers are excavated in the adult at the apices, and is connected with that genus by almost insensible structural gradations.

The species are small, and inhabit the coasts and islands of the Indo-Pacific region; one species, *Actæodes faba*, Dana, occurs in the Atlantic region. Most of them are apparently somewhat local in distribution, but the only species (*Actæodes tomentosus*) collected by the naturalists of the Challenger Expedition, ranged from the Red Sea and the Mauritius eastwards to the Sandwich Islands.

Besides the species described by Dana which are placed by Milne Edwards in *Actæa*, the following are, I think, referable to *Actæodes*:—

Actæodes nodipes, Heller, perhaps = *Actæodes speciosa*, Dana. Red Sea.
Actæodes polyacanthus, Heller. Red Sea.
Actæodes fragifer (White). Philippine Islands.
Actæodes pubescens (Milne Edwards). Mauritius.
Actæodes variolosus (A. Milne Edwards). Upolu, Samoa Islands.

Actæodes tomentosus (Milne Edwards).

Zozymus tomentosus, Milne Edwards, Hist. Nat. Crust., vol. i. p. 385, 1834; Crust. in Latreille, Règne Animal de Cuvier, ed. 3, Atlas, pl. xi. *bis*, fig. 2.
Actæodes tomentosus, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 197, 1852.
Actæodes affinis, Dana, Proc. Acad. Nat. Sci. Philad., p. 78, 1852; U.S. Explor. Exped., *tom. cit.*, p. 197, pl. xi. fig. 3, 1852.
Actæa tomentosa and *affinis*, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. i. pp. 262, 263, 1865.

A series of specimens was collected at Samboangan, Philippines, on the beach.

Adult ♂.	Lines.	Millims.
Length of carapace, ...	6	12·5
Breadth of carapace, ...	9½	20

The basal antennal joint in this species is united in the adult somewhat broadly with the infero-lateral process of the front at its antero-internal angle, but it does not enter the interior orbital hiatus.

Leptodius, A. Milne Edwards.

Leptodius, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, vol. xx. p. 283, 1863; Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 221, 1873.
Chlorodius (sect. 2), Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 207, 1852.
Xanthodius (subgenus), Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 52, 1859.

In this genus the carapace is widely transverse, somewhat depressed, and very distinctly lobulated in its anterior half, posteriorly nearly plain; the frontal margin is truncated and slightly sinuated, with a median notch or fissure; the antero-lateral margins are longer than the postero-lateral margins, and are normally divided into four teeth or lobes, besides the exterior orbital tooth, which is usually obsolete; behind the last antero-lateral tooth are occasionally one or two smaller teeth on the postero-lateral margin; the marginal teeth are usually dentiform, not rounded as in *Actæodes*. The post-abdomen in the male is five-jointed; the three intermediate segments coalescent and forming a single joint. The superior margins of the orbits are marked with two slight notches and fissures. The basal antennal joint reaches the infero-lateral process of the front or even enters slightly within the interior orbital hiatus. The merus of the exterior maxillipedes is truncated or slightly notched at the distal extremity, and its antero-internal angle is slightly emarginate or sinuated; its antero-external angle is often slightly produced.

The chelipedes in the adult male are moderately developed; the merus or arm is short and almost invariably covered in a dorsal view by the antero-lateral margins, carpus dentated on the inner margin, palm not cristated above, fingers excavated at the distal extremity. The ambulatory legs are moderately developed, with the fourth to the sixth joints slightly compressed, but not carinated or spinose; dactyli styliform.

This genus may be considered the representative in the Chlorodiinæ of *Xantho* in the Cancrinæ; it is also nearly allied to *Carpilodes*, *Actæodes*, and to the genus which follows (*Phymodius*).

From *Carpilodes* and *Actæodes* it is usually to be distinguished by the dentiform or tuberculiform antero-lateral marginal teeth, not to speak of other characters.

The species are somewhat numerous; several inhabit the Indo-Pacific region. Two species, *Leptodius macandreæ* and *Leptodius punctatus*, occur in the West Atlantic or at the Canaries and Cape Verde Islands. The others inhabit the American coasts from Florida to Brazil, and from California to Chili. One species (*Leptodius cooksoni*) occurs at the Galapagos. None, I believe, have been recorded from very deep water. They may be distributed under two subgeneric divisions or sections as follows:—

I. Endostome or palate without any trace of longitudinal carina. *Leptodius.*

A. *Indo-Pacific Species (excluding the West Coast of America and Islands adjacent).*

Leptodius exaratus (Milne Edwards) = *Cancer inæqualis*, Audouin; *Xantho affinis*, de Haan; ? *Xantho quinque-dentatus*, Krauss, var.; *Chlorodius edwardsii*, Heller; *Lagostoma nodosa*, Randall (?); *Chlorodius sanguineus*, Milne Edwards, var.; *Xantho distinguendus*, de Haan, var. Indo-Pacific Region. Very common. (The West Indian and Brazilian *Chlorodius floridanus*, Gibbes, is perhaps not specifically distinct from this species).

Leptodius gracilis (Dana). Indo-Pacific Region.

Leptodius eudorus (Herbst). New Zealand.

Leptodius lividus (de Haan). Japanese and Australian Seas.

(The three foregoing species are perhaps mere varieties of *Leptodius exaratus*, for which species, therefore, Herbst's designation *eudorus* may have to be used).

Leptodius nudipes (Dana). Polynesian Islands; New Zealand.

Leptodius hombronii (Jacquinot and Lucas). ?

Leptodius crassimanus, A. Milne Edwards. New Caledonia.

B. *Atlantic Species.*

Leptodius convexus, A Milne Edwards. Cape Verde Islands.

Leptodius punctatus, Miers. Senegambia (9 to 15 fathoms), West Africa; Cape Verde Islands.

Leptodius macandreæ, Miers. Canary Islands.

Leptodius floridanus (Gibbes) = *Chlorodius limosus*, Desbonne and Schramm, and *Etisus occidentalis*, White. West Indies; Florida; Brazil.

Leptodius dispar (Stimpson). Cuba.

Leptodius agassizii, A. Milne Edwards. Florida, 12 to 18 fathoms. Differs from others referred to this genus in the spinuliferous legs.

Leptodius (?) *caribæus* (Desbonne and Schramm). Guadeloupe. This species differs from others, according to A. Milne Edwards, in the longer merus of the chelipedes and the seven-jointed post-abdomen.

C. *West American Species.*

Leptodius occidentalis (Stimpson) = *Chlorodius fischeri*, Lockington. Panama; Mexico; California.

Leptodius cooksoni, Miers. Galapagos Islands.

Leptodius lobatus, A. Milne Edwards. Chili, "S. America" (Coll. Brit. Mus.).

II. Endostome with the longitudinal carinæ partially developed. *Xanthodius*, Stimpson.

Leptodius americanus (Saussure). West Indies; Florida.
Leptodius sternberghii, Stimpson = *Actæodes mexicanus*, Lockington. Panama; California.
Leptodius hebes, Stimpson. Cape St. Lucas, California.

Leptodius exaratus (Milne Edwards), var. *sanguineus*.

Chlorodius sanguineus, Milne Edwards, Hist. Nat. Crust., vol. i. p. 402, 1834. (?)
„ „ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p, 207, pl. xi. fig. 11, 1852.
Leptodius exaratus, var. *sanguineus*, Miers, Proc. Zool. Soc. Lond., p. 134, 1877, et synonyma.

Several specimens were collected at Samboangan, mostly obtained on the beach; one (the largest male) on the reefs, in 10 fathoms; the dimensions of this specimen are as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace,	10	21
Breadth of carapace,	16	34
Length of a chelipede,	18	38

The variety thus designated is generally, but perhaps not invariably, characterised by the presence of one or even two additional marginal teeth behind the fifth and last of the normal antero-lateral teeth; these additional teeth are situated on the postero-lateral margin of the carapace. It is certainly the form figured by Dana as *Chlorodius sanguineus*, but I am not positively convinced of its identity with the *Chlorodius sanguineus* of Milne Edwards. The colour varies from reddish to greenish-yellow; the fingers are dark or light brown.

Leptodius punctatus, Miers.

Leptodius punctatus, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. viii. p. 214, pl. xiii. fig. 3, 1881.

St. Vincent, Cape Verde Islands, July 1873 (a good series of specimens).

The Challenger examples are all of much smaller size than the type from Senegambia, now in the collection of the British Museum, and are mostly of a greenish-yellow colour (in spirit). The antero-lateral teeth of the carapace are connected one with another by a thin crest or keel which borders the antero-lateral margins, and is much less distinctly developed in the larger Senegambian specimen.

The largest example (a female) in the Challenger series measures as follows :—

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	5½	11
Breadth of carapace, nearly	8	16·5

Phymodius, A. Milne Edwards.

Phymodius, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, Zool. xx. p. 283, 1863; Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 217, 1873.
Chlorodius (section 1), Dana, U.S. Explor. Exped., vol. xiii., Crust., p. 205, 1852.

This genus is very nearly allied to the foregoing (*Leptodius*) from which it is distinguished merely by the narrower, nearly hexagonal carapace, which is lobulated not only in front, but also (less distinctly) in its posterior part, by the more elongated chelipedes, whose merus-joints in the typical species are prolonged beyond and are not covered by the antero-lateral margins of the carapace, and by the more or less distinctly granulated or spinuliferous merus, carpus, and penultimate joints of the ambulatory legs. The basal antennal joint is united largely with the infero-lateral process of the front in the typical species. The chelipedes are more or less distinctly tuberculated or spinuliferous.

Phymodius is distinguished from *Chlorodius*, as restricted by recent authors, only by the more distinctly lobulated carapace and chelipedes.

The following species are referred to this genus :—

Phymodius angulatus (Milne Edwards), with vars. *gracilis*, Dana, and *curtimanus*, Dana. Indian Ocean to Polynesian Islands.

Phymodius monticulosus (Dana) = *Chlorodius areolatus*, Adams and White (*nec* Milne Edwards); *Xantho peuce*, White; *Chlorodius obscurus*, Jacq. and Lucas. Indo-Pacific Region.

Phymodius rugipes (Heller). Red Sea.

Phymodius maculatus (Stimpson). Tortugas; West Indies.

Phymodius monticulosus (Dana).

Xantho peuce, White, List Crust. Brit. Mus., p. 125, 1847.
Chlorodius areolatus, Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 41, pl. xi. fig. 3, 1848; *nec* Milne Edwards.
Chlorodius monticulosus, Dana, Proc. Acad. Nat. Sci. Philad., p. 79, 1852, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 206, pl. xi. fig. 9, 1852.
? *Chlorodius obscurus*, Jacquinot and Lucas, Crust. in Voy. au Pole Sud. Zool., t. iii. p. 26, pl. iii. fig. 4, 1853, *bad.*
? *Phymodius obscurus*, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 220, 1873.

Samboangan (beach). Several specimens of different sizes were collected.

The colour of the carapace (in dried or spirit specimens) varies from reddish or chocolate-brown to greyish-yellow.

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	6	12
Breadth of carapace, about	7½	16

In this species or well-marked variety the tubercles of the dorsal surface are stronger and more distinct than in the almost equally common *Phymodius ungulatus*, and they are more or less distinctly granulated or rugose, not (as often in *Phymodius ungulatus*) simply punctulated; the chelipedes have the palm and wrist very distinctly tuberculated, the tubercles becoming spinous in the younger animal, and the finger in the young is spinous at the base; whereas in *Phymodius ungulatus*, the chelipedes are smooth or but obscurely tuberculated, and the fingers are without spines at the base.[1]

B. Endostome longitudinally ridged (Eriphiidæ, Dana) :—

Eurytium, Stimpson.

Eurytium, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 56, 1859.
„ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 332, 1880.

This genus can only be distinguished from *Panopeus* and *Eurypanopeus* by the broader transverse carapace, which is nearly smooth, not lobulated, on the dorsal surface, and in the typical species is convexly arcuated in a longitudinal, not a transverse direction. The ridges on the endostome or palate are distinct and well developed, and the ducts leading to the male copulatory appendages pass to them from the fifth joints of the ambulatory legs beneath the margin of the sternum; a character in which, as Dr. Stimpson notes, this genus is related to the Ocypodoidea.

Professor A. Milne Edwards, however, has shown that short sternal channels for the copulatory organs exist in certain species of *Eurypanopeus*, and I may add, that both in *Panopeus* and in *Eurypanopeus*, the ridges of the endostome or palate are occasionally partially developed.

Only two species are referred by A. Milne Edwards to this genus, *Eurytium limosum* (Say), which occurs on the eastern coasts of the American continent from New York to Rio de Janeiro, and was obtained by the Challenger Expedition at Bermuda, and *Eurytium affine* (*Panopeus affinis*, Streets and Kingsley), which is found on the Californian coast and is intermediate between this genus and *Panopeus*, having the ridges of the endostome well developed, but the carapace shaped nearly as in *Panopeus* and *Eurypanopeus*.

[1] In a large series of specimens of *Phymodius ungulatus*, in the collection of the British Museum, I have observed only one or two specimens which approach *Phymodius monticulosus* in these characters.

Eurytium limosum (Say).

Cancer limosus, Say, Journ. Acad. Nat. Sci. Philad., vol. i. p. 446, 1817.
Eurytium limosum, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 56, 1859.
" " A. Milne-Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 332, pl. lx. fig. 2, 1880, and references to literature.

Hungry Bay, Bermudas. A male and female were obtained in the Mangrove Swamps. In these specimens the notch in the middle of the frontal margin is obsolete; in other particulars they agree with the excellent description and figure of M. A. Milne-Edwards of this species.

The dimensions of these specimens are as follows:—

♂.	Lines.	Millims.
Length of carapace,	6	12·5
Breadth of carapace,	8½	17·5
♀.	Lines.	Millims.
Length of carapace, nearly	8	16·5
Breadth of carapace,	11½	24·5

Pseudozius, Dana.

Pseudozius, Dana (pt.), Amer. Journ. Sci. and Arts, ser. 2, vol. xii. p. 127, 1851; U.S. Explor. Exped., vol. xiii., Crust. 1, p. 229, 1852.

Carapace markedly transverse, depressed, with the dorsal surface nearly smooth, not lobulated, and with the teeth of the antero-lateral margins sometimes developed, sometimes obsolete; the sutures of the dorsal surface (except sometimes the postfrontal or mesogastric suture), are not distinguishable. The front is moderately deflexed, usually less than one-third the width of the carapace, and its anterior margin is sinuated or obscurely bilobate or quadrilobate; the orbits are small, with the margins entire. The ridges of the endostome or palate are wholly or partly developed. The post-abdomen in the male is distinctly seven-jointed (in the species I have examined). The eye-peduncles are set on very short pedicels. The antennules are transversely plicated. The basal peduncular joint of the antennæ is short, and does not attain the infero-lateral angles of the front. The ischium of the outer maxillipedes is not produced at its antero-internal angle; the merus is distally truncated, with the antero-internal angle scarcely, or not at all, emarginate, and the antero-external angle usually not prominent. The chelipedes in the adult male are moderately robust; carpus bluntly toothed on its inner margin, palm nearly smooth, rounded above, fingers toothed on the inner margins and distally acute. The ambulatory legs are of moderate length, with the joints smooth, slightly compressed, but not carinated.

This genus is very nearly allied to *Menippe*, de Haan,[1] from which it is scarcely

[1] Corresponds nearly to *Pseudocarcinus*, A. Milne Edwards; I propose to restrict this latter designation to the *Pseudocarcinus gigas* (Lamarck).

distinguished except by the narrower, smoother, depressed carapace, which is not lobulated, has not the cervical suture developed, and has the antero-lateral margins less distinctly toothed.

Eurycarcinus, A. Milne Edwards,[1] is also very nearly allied to this genus, and should perhaps not be separated from it; the typical species, *Eurycarcinus grandidieri*, from Zanzibar, which I think is identical with *Galene natalensis*, Krauss, is distinguished merely by the more convex carapace, with sinuated but not quadrilobate front and more distinct antero-lateral marginal teeth; the basal antennal joint (in specimens in the museum collection), reaches the inner subocular tooth, but not the infero-lateral angle of the front.

The species (with one exception, *Pseudozius bouvieri*, which I have placed below in a separate subgenus), inhabit the Oriental region. Nothing has been recorded of their bathymetrical distribution.

Subgenus *Pseudozius*.

Carapace moderately transverse, the frontal lobes not prominent (in the species I have examined), the orbital margins not notched, the ridges of the endostome reach the anterior margin of the buccal cavity. The merus of the exterior maxillipedes is not produced at its antero-external angle.

Pseudozius caystrus (Adams and White) = *Pseudozius planus*, Dana. Philippine Islands; Paumotu Archipelago.

Pseudozius inornatus, Dana. Sandwich Islands. Perhaps a variety of *Pseudozius caystrus*.

Pseudozius microphthalmus, Stimpson. Bonin Islands. The diagnosis is in few words, but the species is apparently scarcely distinct from *Pseudozius caystrus*.

Pseudozius sinensis, A Milne-Edwards. China.

Subgenus *Euryozius*, nov.

Carapace very transverse, the median lobes of the front prominent, rounded, orbital margins notched at the antero-external angle. The ridges of the endostome or palate but partially developed. Merus of the exterior maxillipedes slightly produced at its antero-external angle.

Pseudozius bouvieri (A. Milne Edwards) = *Pseudozius mellissii*, Miers, var. (?). Cape Verde Islands; St. Helena; Ascension Island.

[1] *Ann. Soc. Entom. France*, ser. 4, vol. vii. p. 276, 1867.

Pseudozius bouvieri, var. *mellissii* (Pl. XII. fig. 3).

? *Xantho bouvieri*, A. Milne Edwards, Rev. and Mag. Zool., vol. xxi. p. 377, 1869.
Pseudozius mellissii, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. viii. p. 432, 1881.

Ascension Island (an adult female).

This specimen was received among the fishes of the Challenger collection.

Carapace naked, transverse, much broader than long, its surface punctulated, the punctulations numerous and crowded in front, sparser posteriorly, and nearly obsolete near the postero-lateral and posterior margins. Some larger pits occur here and there near the antero-lateral margins, and the upper margins of the carpus and hand of the chelipedes are also punctulated. The front is four-lobed; the two median lobes are prominent and rounded, and separated by a median notch; the outer lobes (or inner orbital angles) are very little prominent, and separated from the median lobes only by a rather shallow sinus. The antero-lateral margins are longer than the postero-lateral margins, and are defined along the greater part of their length by a low, obliquely-striated, entire line or crest; after which follow, at the broadest part of the carapace, two small but distinctly defined teeth. All the segments of the post-abdomen are distinct in both sexes; the two basal segments cover the whole width of the sternal surface between the bases of the fifth ambulatory legs. The chelipedes are large and robust; the arm or merus-joint short, trigonous, with the margins unarmed; carpus large, with its inner margin produced into a broad, squarely truncated lobe; the palm has its upper margin rounded, the lower margin straight, thin-edged and entire; inner surface with a rounded prominence; fingers black, dentated on their inner margins, with acute apices, the coloration not extending over the inner or outer surface of the palm. Ambulatory legs slender, smooth, and nearly naked, with the penultimate and terminal joints canaliculated, the longitudinal channels on the penultimate joints not always extending along the whole length of the joints; the legs of the fourth pair are longer than those of the third pair. The colour in spirit is reddish or bluish-pink.

Adult ♂.	Lines.	Millims.
Length of carapace, about	12	25
Breadth of carapace,	18	38

In a larger male from St. Helena, in the collection of the British Museum, the carapace is even more transverse.

It is with much hesitation that this form is identified with *Xantho bouvieri*, A. Milne Edwards, which is very briefly described, and has not, I believe, been figured, nor am I certain from the short description whether *Xantho bouvieri* be properly a *Pseudozius*, since it is not stated whether the ridges of the endostome are at all developed.

The specimens from St. Helena and Ascension Island differ in the distinctly four-lobed front from A. Milne Edwards' description.

Sphærozius, Stimpson.

Sphærozius, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 35, 1858.

Body subglobose; carapace convex, smooth, shining, and neither lobulated nor sulcated on the dorsal surface, except on the postfrontal or epigastric region, where there is the usual longitudinal median suture, which reaches the front and is posteriorly bifurcated. The antero-lateral margins are shorter than the postero-lateral margins, and are divided behind the postero-lateral angles into four serratures or teeth, which are not spiniform, as in *Pilumnus*. The front is slightly deflexed, about one-third the width of the carapace, and is divided by a median notch; its anterior margin is not separated by a notch from the interior angle of the orbit. The orbital margins are small, entire. The longitudinal ridges of the endostome or palate are not very prominent. The post-abdomen in the male, and in the single specimen I have seen of a female, is distinctly seven-jointed. The eyes are set on short thick pedicels. The basal joint of the antennæ is very short, and does not nearly reach the front; the following joint is slender and just attains the infero-lateral frontal angle. The ischium of the endognath of the exterior maxillipedes is not produced at its antero-internal angle; the merus is distally truncated, with the antero-external angle rounded and not produced, and the antero-internal angle scarcely emarginate. The straight exognath reaches the antero-external angle of the merus of the endognath. The chelipedes are robust, unequal; carpus bluntly toothed on its inner margin, palm rounded above; fingers distally acute and dentated on the inner margins. Ambulatory legs slender and of moderate length, with the joints smooth, hairy; dactyli straight, with a well-developed terminal claw.

The nearest ally to this genus is, I think, *Pilumnopeus*, A. Milne Edwards,[1] from which it is mainly distinguished by the smooth and narrower carapace, which is not lobulated, the absence of the exterior orbital hiatus, and the shorter basal antennal joint. *Pilumnopeus* should not, perhaps, be regarded as generically distinct.

The following species have been referred to *Sphærozius* by its author:—

Sphærozius dispar (Dana). Sooloo Sea.
Sphærozius nitidus, Stimpson. Hong-Kong; Kobé, Japan, 50 fathoms.

Sphærozius nitidus (Pl. XII. fig. 4).

Sphærozius nitidus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 35, 1858.

Kobé, Japan, lat. 34° 38′ 0″ N., long. 135° 1′ 0″ E. (Station 233A), in 50 fathoms (a female).

[1] *Ann. Sc. Entom. France*, ser. 4, vol. vii. p. 277, 1867.

To the description of Stimpson I may add the following:—

This specimen (preserved in spirit) is yellowish; the carapace and chelipedes are thickly punctulated with minute purple spots, which are very indistinct on the upper surface of the palm, and are obliterated on its outer surface; the fingers purplish-brown; the coloration not extending over the inner and outer surface of the palm. Stimpson says nothing with regard to the coloration of his types.

The carapace and chelipedes are smooth and naked except for a few inconspicuous hairs on the interior surface of the carpus; in this particular this species differs altogether from *Pilumnus*, but the ambulatory legs are slightly hairy.

♂.	Lines.	Millims.
Length of carapace,	2½	5
Breadth of carapace,	3	6·5

Pilumnus, Leach.

Pilumnus, Leach, Trans. Linn. Soc. Lond., vol. xi. p. 321, 1815.
„ Milne-Edwards (pt.), Hist. Nat. Crust., vol. i. p. 415, 1834.
Acanthus, Lockington, Proc. Calif. Acad. Nat. Sci., vol. vii. pt. i. p. 32, 1876.
Parapilumnus, *Eupilumnus* (subgenera), Kossmann, Malacostraca in zool. Ergebn. einer Reise Küstengeb. d. rothen Meeres (erste Hälfte), p. 38, 1877; not *Eupilumnus*, Kingsley, Proc. Acad. Nat. Sci. Philad., p. 397, 1879.

Carapace longitudinally convex, little broader than long, with the regions indistinctly defined; it is thickly covered with hair on the dorsal surface, which extends also over the chelipedes and ambulatory legs, but not lobulated as in *Lobopilumnus;* the antero-lateral margins are regularly arcuated, shorter than the postero-lateral margins, and are normally armed with short spines in place of the usual antero-lateral teeth; the orbital margins are sometimes entire, sometimes spinuliferous; the front is rather narrow and its anterior margin is usually spinuliferous or granulated and divided into two rounded lobes by a median emargination, exterior to each of which is usually a smaller lobe or tooth. The endostome is usually very distinctly longitudinally carinated. The post-abdomen of the male is distinctly seven-jointed, and its base usually occupies the whole width of the sternum, between the fifth ambulatory legs. The eyes are of moderate length. The basal antennal joint is short and slender, and barely reaches the infero-lateral frontal process, or sometimes falls short of it; the next joint lies within the interior orbital hiatus. The merus of the endognath of the exterior maxillipedes is distally truncated, and in the typical species is not narrower than the ischium-joint. The chelipedes are moderately robust and usually unequal, with the merus-joint short and trigonous, the carpus and palm more or less granulated and spinuliferous on the superior margin and exterior surface; fingers distally acute or subacute, and dentated on the inner margins; ambulatory legs of moderate length, slightly compressed, but not

carinated, with the fourth to the sixth joints sometimes armed with spinules; dactyli slender, styliform and nearly straight.

The species of this genus are always of small size, and occur very commonly both in the Atlantic and Indo-Pacific regions in shallow, or more rarely in deeper water. The described forms are very numerous; but it is probable that were a revision of the types and of sufficient series possible, it would necessitate the reunion of many of these recently described with the types of the earlier authors. As Professor A. Milne-Edwards, the highest authority on the Brachyura, justly remarks, "It has not yet been proved that the number of spines which cover the carapace and limbs may not vary in different examples of the same species."[1]

In the arrangement of the species which follows, I have found it necessary, in the present state of our knowledge, to arrange them roughly in geographical and chronological order, without regard to their affinities. I must regard the subgeneric distinctions recently proposed by Dr. Kossmann (*tom. cit. supra*, p. 38) and which are cited, but apparently not adopted, by Milne-Edwards, as of doubtful value, and there are not a few species, which, from the descriptions at present published, could not be classed with certainty in any one of the three subgenera he has established.

European and East Atlantic Species.

Pilumnus hirtellus, (Linné) = *Cancer ferrugineus*, Herbst (?). European Seas (to 35 fathoms, Heller).

Pilumnus spinifer, Milne Edwards. Mediterranean; Black Sea; Azores, 50 to 90 fathoms (?).

Pilumnus villosus, Risso = *Pilumnus spinulosus*, Kepler (*fide* Heller). Mediterranean; Black Sea.

Pilumnus affinis, Capello. Setubal, Portugal. (Very near *Pilumnus hirtellus*.)

Pilumnus teixeirianus, Capello. Setubal.

Pilumnus tridentatus, Maitland. Holland; Black Sea. Perhaps not a true *Pilumnus;* it resembles *Pilumnoplax* and *Heteroplax* in the form of the marginal teeth (Coll. Brit. Mus.).

Pilumnus calculosus, Dana. Madeira (?)

Pilumnus africanus, A. Milne Edwards. Gorea and Angola, St. Vincent, Cape Verde Islands.

South African Species.

Pilumnus verrucosipes, Stimpson. South Africa; Simon's Bay (11 fathoms); Senegambia, 9 to 15 fathoms.

[1] Crust. in Miss. Sci. au Méxique, pt. 5, p. 280, 1880.

Pilumnus granulatus, Krauss. Natal. (The *Pilumnus xanthoides*, Krauss, from Natal, which is included by Dr. Kossmann in this genus, differs from the typical *Pilumni* in the form of the antero-lateral marginal teeth.)

West Atlantic Species.

Pilumnus aculeatus (Say). East coast of United States; West Indies (36 fathoms, A. Milne Edwards).

Pilumnus gemmatus, Stimpson. West Indies; Florida (to 37 fathoms). In some particulars this species approaches the genus *Heteractæa*.

Pilumnus reticulatus, Stimpson. St. Thomas.

Pilumnus floridanus, Stimpson. Tortugas; Brazil, off Barra Grande, 30 to 350 fathoms; Bahia (?).

Pilumnus lacteus, Stimpson. West Indies (to 37 fathoms, A. Milne Edwards).

Pilumnus nudifrons, Stimpson. West Indies; Sombrero Key (to 125 fathoms); West Barbados (to 133 fathoms, A. Milne Edwards).

Pilumnus granulimanus, Stimpson. Cuba.

Pilumnus melanecanthus, Kingsley. Florida.

Pilumnus dasypodus, Kingsley. Florida.

Pilumnus caribæus, Desbonne and Schramm. Guadeloupe.

Pilumnus vinaceus, A. Milne Edwards. Florida (to 37 fathoms, A. Milne Edwards). Martinique.

Pilumnus gracilipes, A. Milne Edwards. Barbados, 100 fathoms (A. Milne Edwards).

Pilumnus quoyi, Milne Edwards. Rio de Janeiro; Guiana.

Pilumnus urinator, A. Milne Edwards. Santa Cruz, 245 fathoms.

Pilumnus miersii, A. Milne Edwards. West Indies.

Pilumnus tessellatus, A. Milne Edwards. Brazil, Desterro.

Pilumnus fragosus, A. Milne Edwards. St. Thomas; Bahia, 7 to 20 fathoms.

Pilumnus brasiliensis, n. sp. Bahia, 7 to 20 fathoms.

West American Species.

Pilumnus xantusii, Stimpson. California, Cape St. Lucas.

Pilumnus depressus, Stimpson. California, Cape St. Lucas.

Pilumnus stimpsonii = *Pilumnus marginatus*, Stimpson.[1] California, Cape St. Lucas.

Pilumnus spinohirsutus (Lockington). California.

Pilumnus limosus, Smith. Peru; Panama.

[1] The name *marginatus* is preoccupied by Stimpson himself, for an Oriental species.

Indo-Pacific Species.

Pilumnus vespertilio (Fabricius) = *Pilumnus ursulus*, Adams and White; and *Pilumnus mus*, Dana. Indo-Pacific Region (to 17 fathoms).

Pilumnus tomentosus, Latreille. Off Port Philip, Australia, 33 fathoms (Station 161); Bass Strait, 38 fathoms (Station 162).

Pilumnus peronii, Milne Edwards. Seas of Asia.

Pilumnus forskålii, Milne Edwards = *Cancer incanus*, Forskål. Coasts of Egypt. This is possibly a variety of *Pilumnus vespertilio*, since Dr. Kossmann unites *Pilumnus ursulus* with this species, but in specimens from the Red Sea, referred to *Pilumnus forskålii* in the collection of the British Museum, not only are the tubercles of the palms of the chelipedes more distinctly longitudinally seriate, but also the interior margin of the front is armed with longer spinules.

Pilumnus lanatus, Latreille. East Indies; North and East Australia, to 11 fathoms (H.M.S. "Alert"); Tasmania.

Pilumnus asper (Rüppell). Red Sea.

Pilumnus minutus, de Haan = *Pilumnus hirsutus*, Stimpson. Japan and Corean Straits (to 50 fathoms); North China Sea; New Caledonia; North-East Australia; Holborn Island (20 fathoms).

Pilumnus scabriusculus, Adams and White. Eastern Seas; Samboangan, Philippines.[1]

Pilumnus globosus, Dana. Tahiti and Paumotu Islands; Japan (50 fathoms).

Pilumnus lævimanus, Dana. Balabac Passage; North of Borneo; New Caledonia.

Pilumnus lævis, Dana. Mangsi Islands, Straits of Balabac.

Pilumnus tenellus, Dana. Sooloo Sea, or Straits of Balabac.

Pilumnus rufopunctatus, Stimpson. East and South Australia.

Pilumnus fissifrons, Stimpson. East Australia.

Pilumnus forficigerus, Stimpson. Oosima, Japan (30 fathoms).

Pilumnus lapillimanus, Stimpson. North China Sea (25 fathoms).

Pilumnus marginatus, Stimpson. Loo-Choo.

Pilumnus dorsipes, Stimpson. Hong Kong (10 fathoms).

Pilumnus (?) *pugilator* (A. Milne Edwards). Lifu Island; North-East to East Australia (to 17 fathoms).

Pilumnus fragifer, A. Milne Edwards. Indian Ocean (perhaps a *Pilumnopeus*).

Pilumnus elatus, A. Milne Edwards. Upolu, Samoan Islands.

Pilumnus ovalis, A. Milne Edwards. Sandwich Islands.

[1] *Pilumnus dilatipes*, Adams and White, cannot be referred to this genus. Not only are the palatal ridges nearly obsolete, but the ambulatory legs are strongly cristated. It should probably be constituted the type of a distinct genus, *Lophopilumnus*.

Pilumnus deflexus, A. Milne Edwards. Australia.

Pilumnus cœrulescens, A. Milne Edwards. New Caledonia.

Pilumnus barbatus, A. Milne Edwards. New Caledonia.

Pilumnus cursor, A. Milne Edwards. New Caledonia; North-East Australia; Samoan Islands.

Pilumnus longipes, A. Milne Edwards. New Caledonia. (Perhaps a *Prionoplax*).

Pilumnus purpureus, A. Milne Edwards. New Caledonia.

Pilumnus actumnoides, A. Milne Edwards. New Caledonia.

Pilumnus vermiculatus, A. Milne Edwards. New Caledonia.

Pilumnus nitidus, A. Milne Edwards. New Caledonia.

Pilumnus cristimanus, A. Milne Edwards. New Caledonia.

Pilumnus savignyi, Heller. Red Sea.

Pilumnus vanquelinii (Audouin), Heller. Red Sea. This species resembles *Pilumnus tridentatus* in the form of the antero-lateral marginal teeth.

Pilumnus brachytrichus, Kossmann. Red Sea. (Perhaps, according to Dr. Kossmann, synonymous with *Pilumnus tomentosus*).

Pilumnus longicornis, Hilgendorf. East Africa; Inhambane; Tongatabu (18 fathoms).

Pilumnus dehaani, Miers. Japan (in shell of *Balanus*); Philippines (18 fathoms).

Pilumnus bleekeri, Miers. New Guinea.

Pilumnus labyrinthicus, Miers. North and North-East Australia (to 14 fathoms, H.M.S. "Alert").

Pilumnus seminudus, Miers. North and North-East Australia.

Pilumnus semilanatus, Miers. North and East Australia (to 15 fathoms, H.M.S. "Alert").

Pilumnus pulcher, Miers. North Australia.

Pilumnus normani, n. sp. Ki Islands (140 fathoms), Station 192.

Pilumnus monilifera, Haswell. Tasmania.

Pilumnus terræ-reginæ, Haswell. North-East Australia; Port Molle.

Pilumnus vestitus, Haswell. Port Jackson; Port Stephens.

Pilumnus (?) *glaberrimus*, Haswell. Port Jackson.

Pilumnus (?) *inermis*, Haswell. Port Jackson. (I consider this and the preceding species as doubtfully belonging to *Pilumnus*, on account of the obscurely defined teeth of the antero-lateral margins. *Pilumnus integer*, Haswell, from Port Jackson, which has the antero-lateral margins entire, cannot, I think, be retained in this genus nor can *Pilumnus fimbriatus*, Milne Edwards, for which I have established the genus *Cryptocœloma*.)

Pilumnus africanus, A. Milne Edwards (Pl. XIII. fig. 1).

Pilumnus africanus, A. Milne Edwards, Ann. Soc. Entom. France, ser. 4, vol. vii. p. 280, 1867.

St. Vincent, Cape Verde Islands, July 1873 (a male and a female of large size, with ova).

The specimens in the Challenger collection agree in nearly all particulars with the description of A. Milne Edwards. This species is distinguished from *Pilumnus hirtellus*, of which it may be a variety, by the much more developed spinules of the outer and upper surface of the chelipedes, which spinules are arranged in longitudinal series, and from *Pilumnus villosus* by the unarmed superior margin of the orbit.

The colour (of specimens dry, and in spirits) is reddish-brown, the pubescence yellow; the spinules of the antero-lateral margins and chelipedes and the fingers are black.

The antero-lateral margins are normally six-spined, but the small spine which immediately follows that at the exterior orbital angle (the second of the series) is obsolete on one side and very small on the other in the larger (female) specimen.

The dimensions of both are given below:—

♂.	Lines.	Millims.
Length of carapace,	5	10·5
Breadth of carapace,	6	12·5
Adult ♀.		
Length of carapace,	6½	13·5
Breadth of carapace, nearly	8	17

Pilumnus spinifer (?), Milne Edwards.

? *Pilumnus spinifer*, Milne Edwards, Hist. Nat. Crust., vol. i. p. 420, 1834.
" " *cf.* Savigny, Descr. de l'Egypte, Crust. Atlas, pl. v. fig. 4.
? " " Heller, Crust. des südlichen Europa, p. 73, 1863.

Off Fayal, 50 to 90 fathoms. Several specimens of both sexes.

The specimens very doubtfully referred to this species are of rather small size, and differ from Milne Edwards' description, but not from the figure cited, in having the superior margins of the orbits entire, without spines. The tubercles of the chelipedes only tend to become spinuliferous near the superior margins. There are but three spines on the antero-lateral margins, exclusive of the small spinule at the exterior angle of the orbit, as in the description and figure.[1]

Adult ♂.	Lines.	Millims.
Length of carapace,	4½	9·5
Breadth of carapace,	5½	11·5

[1] Dr. C. Heller (*Sitzungsb. math.-nat. Cl. k. Akad. Wiss. Wien*, vol. xliii. (i.) p. 345, 1861) at first referred Savigny's *Pilumnus* to a new species, designated by Heller *Pilumnus savignyi*, on account of the non-spinuliferous superior margins of the orbits, but in 1863, in the work quoted above, it is referred to *Pilumnus spinifer*, Milne Edwards.

The Challenger specimens are at once distinguished from *Pilumnus tridentatus*, Maitland, as figured by Hoek,[1] by the presence of the small spine at the exterior angle of the orbit, by the distinctly spiniform antero-lateral marginal teeth, by the absence of transverse lines upon the dorsal surface of the carapace, and by other characters.

Pilumnus brasiliensis, n. sp. (Pl. XIII. fig. 2).

The body and limbs are rather thinly clothed with longish hairs; the carapace is convex, broader than long, shaped nearly as in *Pilumnus aculeatus*, and the front is moderately prominent, with the median lobes truncated and armed with short spinules on the anterior margins; the lateral lobes obsolete. The antero-lateral margins of the carapace are armed with three strong spines besides the spine at the outer angle of the orbit; between the outer orbital spine and the first antero-lateral spine is a smaller spinule, and the first antero-lateral spine bears a small accessory spinule on its posterior margin near the base. The dorsal surface of the carapace is without granulations or spinules; the subhepatic region is finely granulated; there is no spinule on the pterygostomian region. The superior and inferior margins of the orbit are armed with strong spinules, which are of unequal size; two on the upper margin and three on the inferior margin (near the inner hiatus of the orbit) being longer than the others. The antennæ and maxillipedes present nothing remarkable. The chelipedes (in the female) are nearly equal, but the right is a little larger than the left; the trigonous merus-joint is granulated on its upper and lower margins and bears a strong acute tooth near the distal angle of the upper margin, which terminates in a spine; the wrist and palm are armed with spinules over the whole of the upper and outer surface, the spinules longer on the upper surface and especially on its inner margin; those of the palm are arranged in eight longitudinal series; the fingers are dentated on their inner margins; the upper is sulcated and granuli-spinulous above at the base. The ambulatory legs are of moderate length and rather slender; the carpus or antepenultimate joint is armed with spinules; the straight and slender dactyli terminate in a small and not strongly curved claw. Colour (in spirit) light yellowish-brown; the hairs yellowish; the fingers of the chelipedes are of a slaty hue, the colour not extending over the inner and outer surface of the palm.

The dimensions are as follows:—

♀.	Lines.	Millims.
Length of carapace, nearly	4	8·5
Breadth of carapace, nearly	5	10·5
Length of a chelipede, nearly	5	10·5
Length of second ambulatory leg,	6	15

[1] *Tijd. Ned. Dierk. Vereenig.*, vol. ii. p. 243, pl. xiv. figs. 12, 16, 1876.

The single specimen (which is a female, perhaps not fully adult), was obtained near Bahia, in 7 to 20 fathoms, with *Pilumnus floridanus*.

This species evidently belongs to the same section of the genus as *Pilumnus aculeatus* (Say), *Pilumnus vinaceus*, A. Milne Edwards, and *Pilumnus caribæus*, Desbonne. It is more nearly allied to the last-mentioned species than to any other of the genus with which I am acquainted, agreeing with it and differing from other allied American species (as described by authors) in having the outer surface of the palms of both chelipedes wholly covered with strong, longitudinally seriate, spiniform tubercles, but it differs in the smooth (not granulated or spinuliferous) carapace, and in the absence of a pterygostomian spine.

From *Pilumnus gracilipes*, A. Milne Edwards, it is apparently distinguished by the well-developed spinules of the upper orbital margin and by the absence of tubercles or spines from the subhepatic and pterygostomian regions.[1]

Pilumnus floridanus, Stimpson (Pl. XIII. fig. 3).

Pilumnus floridanus, Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 141, 1870.
" " A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 287, 1880.

Here is referred an adult ova-bearing female, dredged off the coast of Brazil, in from 30 to 350 fathoms, lat. 9° 5′ 0″ S. to 9° 10′ 0″ S., long. 34° 49′ 0″ W. to 34° 53′ 0″ W. (Stations 122–122c).

This specimen scarcely differs from Stimpson's description in any particular, except in the absence of a transverse series of longer hairs on the frontal region. Several such hairs exist, however, near the front and antero-lateral margins.

From *Pilumnus quoyi*, Milne Edwards, found at Rio de Janeiro,[2] this species would seem to be distinguished by the spinose ambulatory legs.

Three males collected near Bahia, in shallow water, are also doubtfully referred to this species. They are distinguished from the typical *Pilumnus floridanus* only by the absence of the tubercles from that part of the outer surface of the palm of the larger chelipede which lies nearest to the base of the lower (immobile) finger. In all other particulars, as (*e.g.*) the non-spinuliferous lobes of the front and upper margins of the orbits, the form of the carapace, and the moderately robust and elongated spinuliferous and hairy ambulatory legs, they agree with the typical form of the species. In one (the smallest) of these specimens, the tubercles cover a larger part of the outer surface of the palm than in the others. It is worthy of note that the type of Stimpson's description was a female; I think it therefore possible, that the partial absence of the tubercles of the palm of the larger chelipede may be characteristic of the male sex.

[1] The spinules of the upper orbital margins are foreshortened in an anterior view, and are not shown, therefore, in the magnified view of the front (pl. xiii. fig. 2*a*).

[2] A. Milne Edwards, *tom. cit.*, p. 289, pl. l. fig. 5, 1880.

The dimensions of the largest male are as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	3½	7·5
Breadth of carapace, about	4½	9·5
Length of a chelipede, nearly	6	12·5
Length of second ambulatory leg,	6½	13·5

A small male *Pilumnus* is in the collection from St. Thomas (shallow water), which I cannot certainly refer to any species of this very difficult genus, yet do not venture to constitute the type of a distinct species. It is allied to *Pilumnus quoyi*, Milne Edwards, as described and figured by A. Milne Edwards, in many characters, and particularly in the rounded tubercles of the exterior surface of the palms of the chelipedes, which, however, become spinuliform on the superior margins; it differs from that form in having a few very small spinules interspersed among the hairs of the ambulatory legs, &c. *Pilumnus miersii*, A. Milne Edwards, to which it is also nearly allied, has an additional antero-lateral spine. *Pilumnus lacteus*, Stimpson, which it resembles in the whitish pubescence of the body (interspersed with longer hairs), is distinguished by the smooth exterior surface of the palms of the chelipedes.

Adult ♂.	Lines.	Millims.
Length of carapace, about	2	4·5
Breadth of carapace, about	2½	5·5

Pilumnus fragosus, A. Milne Edwards, var.

Pilumnus fragosus, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 296, pl. lii. fig. 1, 1880.

Bahia (7 to 20 fathoms). Two females.

In these specimens the tubercles of the carapace and of the chelipedes are less flattened and less distinctly pedunculated than in the figure of Milne Edwards, whose types were from the island of St. Thomas. There exists a second row of less elevated tubercles behind the tubercles of the protogastric and epigastric lobes which are not shown in the figure cited. I think it therefore possible that the Challenger specimens may prove to be specifically distinct.

The largest example measures as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace,	3½	7·5
Breadth of carapace, about	4½	9·5

This specimen bears ova, and is, therefore, fully adult; some longer hairs are interspersed among the short greyish-brown pubescence of the carapace and limbs; these hairs are slightly clavate.

Pilumnus minutus (?), de Haan, var. *hirsutus*.

Pilumnus minutus, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 19, 50, pl. iii. fig. 2, 1835.
Pilumnus hirsutus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 37, 1858.
" " Miers, Proc. Zool. Soc. Lond., p. 31, 1879.

Specimens are referred to this species from Kobé, Japan, lat. 34° 38′ 0″ N., long. 135° 1′ 0″ E., 50 fathoms (Station 233A).

In the specimens I have examined there is commonly a small accessory spinule on the antero-lateral margins, situated behind the spine at the outer angle of the orbit.

Adult ♂.	Lines.	Millims
Length of carapace, nearly	4	8
Breadth of carapace,	5	10

As the original description of this species by de Haan is very brief, I append t following, based on the largest male in the Challenger series.

The carapace is moderately convex and transverse, and, as well as the ambulato legs, is covered with a short greyish-brown pubescence, interspersed with longer hair the regions are not defined, and the dorsal surface is not distinctly granulated. T front is divided by a median notch into two somewhat obliquely truncated lobes, who anterior margins are not spinuliferous. The orbits are moderately large; the superior margins have very obscure indications of a notch or sinus, their inferi margins are denticulated, the denticles becoming more prominent and spinulifor at the interior subocular lobe, and are armed with four small spiniform teeth, tl second of which in this specimen (but not usually), bears a very small accesso spinule; there is no spinule upon the subhepatic region. The chelipedes are ver unequal, with the merus short, trigonous, and denticulated on the superior and anteri margins, the carpus armed with granules, which tend to become spinuliform, on tl superior and exterior surface; palm (in the larger chelipede) granulated above and the base, but smooth over nearly the whole of its outer surface; in the smaller chelipe it is covered, both above and externally, with conical, acute granules or small spine dactyli granulated above at the base (but very obscurely in the larger chelipede); finge toothed (the dactylus rather obscurely), on the inner margins. The ambulatory le are clothed, especially on the last three joints, with greyish pubescence, interspersed wit longer hairs, but are not armed with spines or spinules.

In 1879 I regarded Stimpson's species, *Pilumnus hirsutus*, as distinct from *Pilumnu minutus*, de Haan, on account of the acute antero-lateral marginal teeth, and the dentic lated inferior orbital margins, but I am now inclined to regard *Pilumnus hirsutus* as variety only of *Pilumnus minutus*; the diagnosis of de Haan's species is, however, ver short and the figure insufficient.

Pilumnus globosus, Dana.

Pilumnus globosus, Dana, Proc. Acad. Nat. Sci. Philad., p. 81, 1852; U.S. Explor. Exped., vol. xiii., Crust. 1, p. 236, pl. xiii. fig. 10, 1852.

Kobé, Japan, 50 fathoms (Station 233A), lat. 34° 38′ 0″ N., long. 135° 1′ 0″ E. (two females).

The specimens referred to this species have the body more thickly covered with yellowish-brown hair than the types described by Dana and a specimen in the British Museum collection, and the under as well as the upper surface of the palm is fringed with long hairs.

♀.	Lines.	Millims.
Length of carapace,	3	6·5
Breadth of carapace,	4	8·5

Pilumnus dehaani, Miers (Pl. XIV. fig. 1).

Pilumnus dehaanii, Miers, Proc. Zool. Soc. Lond., p. 32, 1879.

Philippines, lat. 11° 37′ 0″ N., long. 123° 31′ 0″ E.; 18 fathoms (Station 208). A small female.

♀.	Lines.	Millims.
Length of carapace, nearly	2	5
Breadth of carapace,	2½	5·5

The figure, which I think it useful to give of this species (which may prove to be a variety of *Pilumnus* (?) *squamosus*, de Haan, although differing in the points I have indicated in the original description) is from the large type specimen in the collection of the British Museum. In the very small Challenger specimen the tubercles of the chelipedes, although conical, are less prominent.

Pilumnus forficigerus, Stimpson,[1] which is a nearly allied form, dredged at Oosima in 30 fathoms, is apparently distinguished by the less numerous tubercles of the palm of the smaller chelipede, and also by the smooth carpi of the chelipedes.

Pilumnus scabriusculus (?), Adams and White.

? *Pilumnus scabriusculus*, Adams and White, Crust. Zool. H.M.S. "Samarang," p. 44, pl. ix. fig. 5, 1848.

Philippines, Samboangan, an adult male, found on the beach.

In this specimen the interregional sutures of the dorsal surface of the carapace, which are very indistinctly indicated in the figure given by Adams and White (and in a specimen which I suppose to be typical, in the collection of the British Museum) are obliterated.

[1] *Proc. Acad. Nat. Sci. Philad.*, p. 36, 1858.

In neither of the specimens I have seen is the front subtriangular as in the original description, which I think to be erroneous in this particular.

The species is apparently well characterised by the uniformly granulated carapace, which is covered by a fuscous pubescence which arises in tufts of two or three setæ, from each of the granules of the dorsal surface, and by the wide, denticulated or granulated teeth of the antero-lateral margins, as shown in the figure referred to.

In the specimens I have examined the front is four-lobed; the median lobes subtruncated and somewhat more prominent than the lateral lobes, which are small and dentiform, and situated just inside of the inner canthus of the orbit.

Another specimen in the British Museum collection which was designated (though not by White), *Pilumnus scabriusculus*, certainly does not belong to this species, but to the variety of *Pilumnus longicornis*, described below, having a deeply incised four-lobed front, and prominent spiniform antero-lateral marginal teeth.

The Challenger specimen, which is rather the larger, has the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace,	10½	22
Breadth of carapace, nearly	13	27

The pubescence of the carapace and limbs is yellow; the merus-joints of the ambulatory legs are thin-edged and acute, but are not distinctly carinated as in the species designated *Pilumnus dilatipes*, Adams and White.

Pilumnus normani, n. sp. (Pl. XIV. fig. 2).

The carapace is broader than long, longitudinally convex, and covered with a short, thick, close pubescence, from amongst which spring numerous longer hairs. The front is but slightly deflexed, and is divided by a deep median sinus; the median lobes are broad, subtruncated, and obscurely granulated on the margins, the lateral lobes very small and dentiform. The surface of the carapace, beneath the pubescence, is smooth, not granulated. The orbits are obscurely granulated on their upper margins, and more distinctly on the lower margins, where the granules tend to become spinuliform as they approach the inner subocular spine. The antero-lateral margins are armed with three strong, simple spines, behind the spine at the exterior angle of the orbit, which is smaller than the antero-lateral spines; there are no spines on the subhepatic and pterygostomian regions, which are slightly pubescent, but one or two small granules on the subhepatic region. The basal antennal joint does not nearly reach the infero-lateral process of the front. The left chelipede is wanting, the right (in the male) is moderately robust; merus-joint granulated on its upper and antero-inferior margins, and armed on the upper margin with a spine immediately behind the small distal spine;

carpus clothed externally with rather long hairs, and covered on the whole of its outer surface with small spinules, and with a stronger spine on the inner margin; palm clothed with longish hairs on its upper surface, and on the outer surface near the base, spinulose on its upper margin, and granulated on the whole of its outer surface; the granules are longitudinally seriate, and become spinuliform near the articulation with the wrist; the fingers are denticulated on their inner margins, the dactyl obscurely sulcated and granulated above at the base; the ambulatory legs are somewhat elongated, and clothed with a short pubescence and with longer hairs. Colour of the short pubescence, greyish-yellow (in spirit), the longer hairs yellowish; fingers of chelipedes chocolate-brown, the coloration not extending over the inner or outer surface of the palm.

Adult ♂.	Lines.	Millims
Length of carapace,	5½	11·5
Breadth of carapace, about	6¾	14
Length of a chelipede, about	7½	16
Length of second ambulatory leg,	10	21

Near the Ki Islands, Station 192, lat. 5° 49′ 15″ S., long. 132° 14′ 15″ E., 140 fathoms (an adult male).

The nearest ally to this species with which I am acquainted is *Pilumnus purpureus*, A. Milne Edwards,[1] from New Caledonia, from which *Pilumnus normani* is distinguished by the smooth, not granulated, dorsal surface of the carapace. A strong spinule exists on the inner margin of the carpus in *Pilumnus normani*, which is not shown in Milne Edwards' figure of *Pilumnus purpureus*.

From most of its congeners it may be distinguished by the distant and greatly elongated antero-lateral marginal spines.

Pilumnus longicornis, Hilgendorf, var.

? *Pilumnus longicornis*, Hilgendorf, Monatsber. d. k. preuss. Akad. d. Wiss. Berlin, p. 794, pl. i. figs. 8, 9, 1878.

In the Challenger specimen referred to this species the carapace is convex, rather broader than long, its surface roughened with small granules, from which spring rather long fulvous hair. Similar hairs cover the dorsal and posterior (or outer) surface of the chelipedes and ambulatory legs; this pubescence, however, is not so thick as to conceal completely the granulations of the carapace and limbs. The cervical and cardiaco-branchial sutures are distinct. The front equals in width about one-third the greatest width of the carapace, and is divided into four lobes; the median lobes broad, subtruncated, and separated by a rather deep median suture; the lateral lobes small and

[1] *Nouv. Archiv. Mus. Hist. Nat.*, vol. ix. p. 246, pl. x. fig. 5, 1873.

dentiform. The orbit has two very obscurely indicated sutures in its upper margins; its lower margin is subentire, without distinct spinules. The antero-lateral margins are shorter than the postero-lateral, and are armed with three spiniform teeth; there is no distinct tooth or spine at the outer angle of the orbit, and the small tooth which in this genus usually exists on the subhepatic region is also deficient, but the subhepatic region is granulated. The terminal segment of the male post-abdomen narrows somewhat to the distal extremity, which is bluntly rounded. The eye-peduncles are of the form usual in the genus, moderately short and thick. The antennæ terminate in rather long flagella, their basal joint barely reaches to the subfrontal process, and does not nearly attain the inner suborbital angle; the merus-joint of the outer maxillipedes is rather broader than long, and is distinctly excavated at its antero-internal angle. The chelipedes are nearly of equal size, but the right is a little larger than the left; the trigonous arm or merus-joint has a strong curved spine near the distal end of its upper margin, the wrist is covered on its upper and outer surface with large but not very numerous granules, which in some places are spinuliform, and there is a spine on the inner margin of the wrist; the palm, also, is covered on its upper and outer surface with conical acute granules, which on the upper margin are more distinctly spinuliform, and are disposed in longitudinal series over the whole of the outer surface, but on the lower margin are more numerous and crowded; the fingers are short, armed on their inner margins with rather indistinct serrated teeth; the dactylus longitudinally sulcated and granulated at the base. The ambulatory legs are rather robust and of moderate length; the merus-joints in the first three pairs are armed with a blunt tooth or lobe behind the upper and distal angle, which is also produced, dentiform and acute; the dactyli are styliform, more slender than the preceding joints, and armed with a small claw. The ground colour of the carapace and limbs (in spirit) is light reddish-brown, but the pubescence with which the body and legs are clothed is of a whitish-yellow hue; the fingers are chocolate-brown; the coloration not extending over any part of the inner and outer surface of the palm.

Adult ♂.	Lines.	Millims.
Length of carapace,	7	15
Breadth of carapace, about	9	19
Length of larger chelipede, when extended as far as its conformation will allow,	9	19
Length of second ambulatory leg, about	1 inch	25

The single specimen in the Challenger collection (an adult male), was collected off Nukalofa, Tongatabu, in 18 fathoms (Station 172).

I have examined in the British Museum collection a specimen apparently of this species, without definite locality, referred to above as having been erroneously designated *Pilumnus scabriusculus*, White. The pubescence is everywhere much thinner than in the Challenger specimen, and is, in fact, nearly absent from the dorsal surface of the carapace.

From the typical form of this species, as figured by Hilgendorf, the Challenger type can only be distinguished by the less distinctly toothed orbital margins, the strongly and distinctly granulated palm of the larger chelipede (the granules being arranged, as in the smaller chelipede, in longitudinal series over the whole of the outer surface), and the stronger tooth or spine at the distal extremity of the superior margins of the meral joints of the ambulatory legs.[1]

Pilumnus vestitus, Haswell (Pl. XIV. fig. 3).

Pilumnus vestitus, Haswell, Proc. Linn. Soc. N.S.W., vol. vi. p. 753, 1882; Cat. Aust. Crust., p. 68, 1882.

Port Jackson (shore) an adult female :—

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	6	12
Breadth of carapace,	7	15

Mr. Haswell's description in the Australian Catalogue is very brief, and I therefore append the following description of the specimen in the Challenger collection referred to this species.

Carapace moderately convex and transverse, covered, as well as the limbs, with yellow hairs. The front is divided by a median notch into two rather prominent rounded lobes, which are separated from the rounded interior angle of the orbit by a sinus. The superior margin of the orbit is subentire, the inferior margin is granulated, the interior subocular angle of the orbit is but slightly prominent and dentiform. The subhepatic and pterygostomian regions are granulated. The antero-lateral margins are armed with three acute spines behind the spine at the exterior angle of the orbit. The chelipedes (in the female) are nearly equal, the left somewhat the larger; the short, trigonous merus-joint is armed with a short spine at the distal extremity of its superior margin, and with another spine just posterior to this; the wrist and palm are armed with conical acute granules or short spines, which are not very numerous, and are smaller near the inferior margin of the palm and the base of the immobile finger, which is regularly and distinctly dentated; the dactylus is more obscurely dentated on the interior margin and is granulated above at the base; the ambulatory legs are slightly compressed, and the fifth and sometimes the fourth and sixth joints are armed with spinules on their superior margins.

[1] *Pilumnus dorsipes*, Stimpson (*Proc. Acad. Nat. Sci. Philad.*, p. 37, 1858), from Hong-Kong, which, to judge from the brief description, is apparently a nearly allied form, is apparently distinguished by the sulcated latero-inferior margin of the carapace.

Pilumnus tomentosus (?), Latreille (Pl. XIV. fig. 4).

? *Pilumnus tomentosus*, Latreille, Encycl. Méth., vol. x. p. 125, 1825.
" " Milne Edwards, Hist. Nat. Crust., vol. i. p. 418, 1834.

Specimens from Bass Strait, are referred, but very doubtfully, to this species. They were collected off East Moncœur Island in 38 fathoms (Station 162). Also a female from the entrance to Port Philip, Australia, 38 fathoms (Station 161).

Pilumnus tomentosus is but very briefly characterised, and has, I believe, never been figured, therefore its identification must remain uncertain. The species I thus designate is, it would appear, one of the commonest on the South and South-Eastern Australian coasts. The colour is variable; the specimens from East Moncœur Island are light reddish-brown with yellowish pubescence, that from Port Philip is darker brown, and others in the collection of the British Museum blackish-brown, as in the description of Milne Edwards; the pubescence is always short and rather dense. The frontal lobes are rather prominent and rounded, the orbital margins are not distinctly denticulated above; there exists, besides the spinules mentioned by Milne Edwards, a small spinule on the subhepatic region, which is visible between the exterior orbital and first antero-lateral spine. The surface of the carapace is sometimes smooth, but usually bears several spinuliform granules near the antero-lateral marginal teeth, these granules and the spinules of the upper surface of the wrist and palm in the Challenger specimens from Bass Strait (Station 162) are red coloured.

Adult ♂.	Lines.	Millims
Length of carapace, about	8	17
Breadth of carapace, about	10½	22

Pilumnus rufopunctatus, Stimpson (Pl. XIV. fig. 5).

Pilumnus rufopunctatus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 36, 1858.

South Australian coast, 2 to 10 fathoms, April 1874. (A small ova-bearing female).

This species is apparently distinguishable from the one I have referred to as *Pilumnus tomentosus*, by the broader carapace, less prominent front, the existence of several denticules on the upper margin of the orbit, and by the closely approximated granules on either side of the median line of the carapace, on the front of the gastric region.

The pubescence of the carapace is short, close, and rather dense, especially near the front and antero-lateral margins; the dorsal granules are less numerous than in Stimpson's description. The granulations of the larger chelipede, which extend over the outer surface, are absent from the inferior margin. If, as is possible, this species be the true *Pilumnus tomentosus*, Latreille, the Challenger specimens designated *Pilumnus tomentosus* must receive a new specific designation.

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	4	8
Breadth of carapace, about	5½	11·5

In this specimen the pubescence of the carapace is not so dense as in adult males in the British Museum (H.M.S. "Alert").

Pilumnus pulcher, Miers.

Pilumnus pulcher, Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 219, pl. xxii. fig. A, 1884.

Torres Strait, August 1874; a fine adult male. Off Cape York, 8 fathoms, lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E. (Station 186) a very small male.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	13½	28·5
Breadth of carapace,	15½	33

The pubescence in the small male is whitish, not yellow as in the adult.

Pilumnus seminudus, Miers.

Pilumnus seminudus, Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 222. pl. xxi. fig. C, 1884.

An adult male was obtained in Torres Strait with the preceding species.

Adult ♂.	Lines.	Millims.
Length of carapace, about	4½	9
Breadth of carapace.	6	13

Pilumnus labyrinthicus, Miers.

Pilumnus labyrinthicus, Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 224, pl. xxii. fig. C, 1884.

Near Cape York, lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E., in 8 fathoms (Station 186). A small male.

The vermicular ridges of the carapace in their number and disposition closely resemble those of the larger example, which is the type of my figure and description. The coloration is similar except as regards the fingers, which are white.

♂.	Lines.	Millims.
Length of carapace,	3	6·5
Breadth of carapace, nearly	4	8

Eriphia, Latreille.

Eriphia, Latreille, Crust. in Règne Animal de Cuvier, ed. 1, vol. iii. p. 18, 1817.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 425, 1834.

Carapace moderately convex, but little broader than long, with the antero-lateral margins much shorter than the postero-lateral margins; the frontal region broad, but the front not prominent; the antero-lateral margins (and usually the front) are spinuliferous, and the parts adjacent are usually armed with tubercles or short spines. The post-abdomen in the male is usually distinctly seven-jointed. The eye-peduncles are short and deeply set in the orbits, whose prominent margins are often granulated; it is broadly united with the front at its interior angle, so that the antenna is completely excluded from the orbit. The epistoma is transverse; the ridges of the endostome or palate are strongly defined. The basal antennal joint barely reaches the inferior margin of the front, but the flagellum is more developed than in many genera of Cancroidea. The ischium of the endognath of the exterior maxillipedes is not produced at its antero-internal angle; the merus is truncated but not emarginate at the distal extremity, and scarcely, if at all, emarginate at its antero-internal angle. The chelipedes (in the adult male) are considerably developed and usually unequal; fingers distally acute or subacute; ambulatory legs of moderate length, with the joints neither carinated nor spiniferous; dactyli styliform, nearly straight.

The following are species of this genus :—

Eriphia spinifrons (Herbst). Mediterranean and Black Seas; Canary Islands; Madeira; Japan (?); Singapore (?) (Coll. Brit. Mus.).

Eriphia lævimana, Milne Edwards = *Eriphia rugosa*, Milne Edwards (*nom. ined.* ?); *Eriphia fordii*, MacLeay, and *Eriphia smithii*, MacLeay, var.; *Eriphia trapeziformis*, Hess. Indo-Pacific Region.

Eriphia scabricula, Dana. Indo-Pacific Region.

Eriphia gonagra (Fabricius). Florida to Brazil (Rio de Janeiro).

Eriphia armata, Dana. East Patagonia.

Eriphia squamata, Stimpson. West American Coasts (California to Chili); (perhaps a variety of *Eriphia gonagra*).

Eriphia granulosa, A. Milne Edwards. Chili.

Eriphia gonagra (Fabricius).

Cancer gonagra, Fabricius, Entom. Syst., vol. ii. p. 466, 1793; Suppl., p. 337, 1798.
Eriphia gonagra, Milne Edwards, Hist. Nat. Crust., vol. i. p. 426, pl. xvi. figs. 16, 17, 1834.
„ „ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 338, pl. xvi. fig. 4, 1880.

Bermuda (a small adult male) :—

Adult ♂.	Lines.	Millims.
Length of carapace, ...	5	10·5
Breadth of carapace, ...	7	14·5

Section II. **Trapeziinæ.**

Cancériens quadrilatères, Milne Edwards (pt.), Hist. Nat. Crust., vol. i. pp. 369, 424, 1834.
Trapézides, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, Zool., vol. xviii. p. 41, 1862; Nouv. Archiv. Mus. Hist. Nat., vol. i. p. 183, 1865.

Carapace depressed and nearly quadrilateral, smooth, with the postero-lateral angles truncated, the dorsal regions not defined; the antero-lateral margins are straight, form a right angle with the front, and are entire or have but one tooth (the lateral epibranchial tooth) developed. The front is horizontal, broad, lamellate, and projects over the antennules and bases of the antennæ, which are widely excluded from the orbits.

The genera comprised in this section are the following :—

Trapezia, Latreille (= *Grapsillus*, MacLeay).
Tetralia, Dana.
Quadrella, Dana.[1]

Trapezia, Latreille.

Trapezia, Latreille, Fam. Nat. du Règne Animal, p. 269, 1825; Crust. in Règne Animal de Cuvier, ed. 2, vol. iv. p. 41, 1829.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 427, 1834.
Grapsillus, MacLeay, Annulosa in Smith, Zool. South Africa, p. 67, 1838.

The carapace is nearly quadrate, depressed, smooth, with the antero-lateral margins parallel, the postero-lateral margins convergent backwards from the lateral epibranchial spine, which is not always developed, the regions on the dorsal surface are not indicated; the front projects beyond the orbits, and is divided into several lobes or teeth. The post-abdomen in the male is usually five-jointed. The short eye-peduncles are not concealed by the shallow orbits, whose margins are without fissures; there is often a tooth or

[1] The Crustacean from Providence Island (19 fathoms), referred to without specific or generic designation in my Report on the Crustacea of H.M.S. "Alert" (Zool. Coll., p. 536, footnote, 1884), belongs to this rare genus, and is even perhaps identical with Dana's species, *Quadrella coronata*.

spine at the inferior and inner lobe of the orbit, which lobe attains the front, so as to exclude the antennæ from the orbital cavity. The peduncular joints of the antennæ are small and slender; the basal joint does not nearly reach the front. The exterior maxillipedes are small, the ischium-joint not produced at the antero-internal angle; the merus with the antero-internal angle obliquely truncated, scarcely, if at all, emarginate, the antero-external angle not produced. The chelipedes in the adult male are subequal, and considerably developed; merus with the antero-external angle dentated or spinose toward the distal extremity; carpus without spines, palms somewhat compressed, smooth; fingers distally acute, with small teeth or granules near the base; the dactylus sometimes with a larger, granulated, subbasal lobe on the inner margin; the ambulatory legs are small, with the joints slightly compressed, the dactyli hairy and rather shorter than the penultimate joints.

The species are small, and commonly inhabit the coral reefs of the Indo-Pacific region. They are connected one with another by almost insensible gradations of form and colour, hence their discrimination is extremely difficult, as shown by Dr. R. Kossmann,[1] who, indeed, would apparently regard all, except perhaps *Trapezia digitalis*, Latreille, as varieties of a single species.

In the following enumeration of the described species I have grouped them mainly according to the presence of the lateral epibranchial tooth, by the form of the chelipedes, and according to their colour-variations; but I would not be understood as regarding all as distinct and well-characterised types.

1. Carapace without lateral spines or teeth :—

(1) Carapace neither spotted nor areolated.

Trapezia digitalis, Latreille = *Trapezia leucodactyla*, Rüppell. Red Sea.

Trapezia formosa, Smith. Pearl Islands, Bay of Panama. (Perhaps not specifically distinct from *Trapezia digitalis*).

(2) Carapace areolated.

Trapezia speciosa, Dana. Paumotu Archipelago, Carlshoff Island.

(3) Carapace spotted.

Trapezia bella, Dana. Paumotu Archipelago, Carlshoff Island.

2. Carapace with a spine or tooth in the middle of the lateral margins (the lateral epibranchial tooth) :—

(1) Carapace and limbs of a uniform colour, without spots or areolæ.

[1] Zool. Ergebn. einer Reise Küstengeb. d. rothen Meeres, Malacostraca, pp. 11–15, 1877.

a. Palms of chelipedes subcristate above, externally hairy. Lateral marginal teeth of carapace usually acute in the adult.

Trapezia cymodoce (Herbst), Miers, 1878 = *Trapezia ferruginea*, Latreille; *Trapezia dentifrons*, Latreille; *Trapezia hirtipes*, Jacquinot and Lucas. Oriental Region. The citations of *Trapezia cymodoce* and *dentifrons* for this species are a little doubtful; it is certainly the form figured by MM. Jacquinot and Lucas as *Trapezia hirtipes*.

b. Palms of chelipedes rounded above, externally glabrous. Lateral marginal teeth of carapace blunt or almost obsolete in the adult.

Trapezia cærulea, Rüppell = *Trapezia miniata*, Jacquinot and Lucas (?); *Trapezia subdentata*, Gerstæcker; *Grapsillus subinteger*, MacLeay. Oriental Region. I was probably wrong in designating this species, in 1878, by Latreille's name, *Trapezia ferruginea*, as that author describes the superior margins of the palms of the chelipedes as acute. The citations of *Trapezia miniata*, *Trapezia subdentata*, and *Grapsillus subinteger* for it, are, on account of the insufficiency of the authors' descriptions, somewhat uncertain.

The following species have a uniformly coloured carapace, and may be identical with one or other of the two preceding groups:—

Trapezia dentata, MacLeay. Cape of Good Hope. (Perhaps identical with *Trapezia cymodoce*.)

Trapezia fusca, Jacquinot and Lucas. Noukahiva, Marquesas Islands. (Perhaps identical with *Trapezia cærulea*.)

Trapezia corallina, Gerstæcker. Veragua.

Trapezia nigrofusca, Stimpson. Cape St. Lucas, California. (Perhaps identical with *Trapezia corallina*, but is dark brown, not red, and the front is entire, not denticulated.)

(2) Carapace of a uniform colour, the limbs spotted.

Trapezia guttata, Rüppell. Red Sea.

(3) Carapace marked with pink spots.

Trapezia rufopunctata (Herbst) = *Grapsillus maculatus*, MacLeay; *Trapezia tigrina*, Eydoux and Souleyet; *Trapezia acutifrons*, A. Milne Edwards, var. Oriental Region.

(4) Carapace areolate, with pink reticulating lines.

Trapezia areolata, Dana = *Trapezia reticulata*, Stimpson (?); *Trapezia areolata*, var. *inermis*, A. Milne Edwards; *Trapezia areolata*, var. *lævis*. Polynesian Islands; Loo-Choo. This species varies much in the acuteness of the lateral marginal teeth and in the size of the areoles of the carapace, which may extend over the chelipedes, and perhaps over the ambulatory legs (*cf.* Stimpson).

Trapezia flavo-punctata, Eydoux and Souleyet = *Trapezia latifrons*, A. Milne Edwards (?). Sandwich Islands; New Caledonia. Distinguished from *Trapezia areolata* by the areolated ambulatory legs, and by having the inferior margins of the palms of the chelipedes armed with granules or small tubercles.

Trapezia cymodoce (*?*), (Herbst).

? *Cancer cymodoce*, Herbst, Naturgesch. der Krabben u. Krebse, vol. iii. (2), p. 22, pl. li. fig. 5, 1801.

Trapezia ferruginea, Latreille, Encycl. Méth. Hist. Nat., vol. x. p. 695, 1825.

„ *hirtipes*, Jacquinot and Lucas, Crust. in Voy. au Pole Sud. Zool., vol. iii. p. 44. pl. iv. fig. 14, 1853.

„ *cymodoce*, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. ii. p. 409, 1878, et synonyma.

Samboangan, Philippines, 10 fathoms, on the reefs, an adult male and female; off Nukalofa, Tongatabu, 18 fathoms, in lat. 20° 58′ 0″ S., long. 175° 9′ 0″ E. (Station 172), an adult and a fully grown and a smaller female.

As I have noted above, the carapace and limbs in this species are of a uniform reddish or bluish-brown, without reticulating lines or spots; the lateral marginal teeth of the carapace are acute and well developed in the adult; the palms of the chelipedes are subcristated on the superior margins, and hairy on the exterior surface.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	7	14·5
Breadth of carapace, about	7½	16·5
Length of a chelipede, nearly	15	31·5
Length of first ambulatory leg,	9	19

Trapezia guttata, Rüppell, var. (Pl. XII. fig. 1).

cf. Trapezia guttata, Rüppell, Beschreib. u. Abbild. 24 kurzschwänzigen Krabben als Beitrag zur Naturgesch. des rothen Meeres, p. 25, 1830.

Kandavu, Fiji Islands (on the reefs), a small female.

In this variety, to which I think it unnecessary to apply a distinctive appellation,

the carapace and chelipedes are of a uniform reddish or yellowish-brown. The ambulatory legs, but not the chelipedes, are covered with small, distinct, red or brownish spots.

In Rüppell's specimens from the Red Sea, it would appear from the diagnosis, which is, however, very short, that all the legs are covered with small dark brown spots.

♀.	Lines.	Millims.
Length of carapace, nearly, ...	4	8
Breadth of carapace, about	4½	10

Trapezia areolata, var. *inermis*, A. Milne Edwards.

Trapezia areolata, var. *inermis*, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 259, pl. x. fig. 6, 1873.

Kandavu, Fiji Islands (a female with ova).

In this form, distinct areolæ, formed of pink reticulating lines, exist on the dorsal surface of the carapace and on the chelipedes, but not on the ambulatory legs; the denticules of the front and the lateral marginal teeth of the carapace are blunt in the adult.

♀.	Lines.	Millims.
Length of carapace, about	4	9
Breadth of carapace, nearly	5	10
Length of a chelipede, ...	8	16·5
Length of first ambulatory leg, ...	5	10·5

Trapezia rufopunctata (Herbst).

Cancer rufopunctatus, Herbst, Naturgesch. der Krabben u. Krebse, vol. iii. (I) p. 54, pl. xlvii. fig. 6, 1799.
Trapezia rufopunctata, Latreille, Encycl. Méth. Hist. Nat., vol. x. p. 695, 1825.
" " A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 258, 1873, et synonymâ, except *Trapezia flavopunctata*, Eydoux and Souleyet.
" " Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 536, 1884.

Samboangan, reefs (10 fathoms) an adult male and female.

These specimens have the frontal lobes deeply cut, as in the figure of Herbst, but the reddish spots which cover the body and legs are somewhat larger. In the female the spots of the smaller (right) chelipede are much larger and fewer in number than those of the left chelipede, which is of interest as showing how little reliance is to be placed upon the number and size of these spots for distinguishing the species or varieties.[1]

[1] In this species, the inferior margins of the palms of the chelipedes are sometimes granulated as in *Trapezia flavopunctata*, Eydoux and Souleyet, but *Trapezia flavopunctata* is distinguished (if the figure is to be trusted) by the coloration of the carapace, which is reticulated (not spotted), with red lines which circumscribe yellow spots.

The dimensions of this specimen, which is of larger size than the male, are :—

Adult ♀.	Lines.	Millims.
Length of carapace,	8½	18
Breadth of carapace,	9½	20
Length of left chelipede,	17½	36·5
Length of first ambulatory leg,	9½	20

An adult ova-bearing female from Honolulu, 18 fathoms, has the spots of the carapace and legs much less numerous, the front less deeply incised.

Adult ♀.	Lines.	Millims.
Length of carapace,	6	12·5
Breadth of carapace, about	7½	15·5
Length of a chelipede, nearly	13	27
Length of first ambulatory leg,	7½	16

It belongs to the variety which I erroneously referred, in the Report on the Crustacea of H.M.S. "Alert" (*tom. cit.*, p. 536), to *Trapezia guttata*, Rüppell.

Trapezia rufopunctata (Herbst), var. *intermedia*, nov. (Pl. XII. fig. 2).

Thus are designated a male and two female examples in the collection from Honolulu (reefs), which differ from any specimens of *Trapezia rufopunctata* I have seen in the coloration of the palms of the chelipedes, which are transversely marked on the upper surface with irregular, reddish lines, which tend to unite and form reticulations; the inferior half of the inner and outer surfaces of the palms are uniformly reddish-brown.

The body and limbs, except the palms and fingers of the chelipedes, are marked with red spots; the anterior margin of the front is sinuated; the teeth but very little developed; the median tooth of the lateral margins of the carapace (the lateral epibranchial tooth) blunt or rudimentary; the anterior margin of the merus of the chelipedes is armed with from five to eight serratures, whose margins are crenulated, the palms of the chelipedes are compressed, with the superior margins rounded or subacute, but not carinated. The ground colour of the carapace and limbs is yellowish, fingers light chocolate-brown.

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	6½	13·5
Breadth of carapace,	8	17
Length of a chelipede, nearly	14½	30·5
Length of first ambulatory leg,	9½	20

Family II. Portunidæ.

Portuniens, Milne Edwards (tribe), Hist. Nat. Crust., vol. i. p. 432, 1834.
,, A. Milne Edwards (family), Archiv. Mus. Hist. Nat., vol. x. p. 311, 1861.
Portunidæ and *Platyonychidæ*, Dana, U.S. Explor. Exped., vol. xiii. Crust. 1, pp. 267, 290, 1852.

Carapace (in the recent forms at least), depressed, usually more or less hexagonal, never very convex. Fifth pair of ambulatory legs nearly always natatorial, with the dactylus ovate, expanded, and lamellate.

Species marine or littoral.

The genera of this family have been grouped under the following primary sections:—

I. Portuniniæ. II. Podophthalminæ.

Section I. **Portuninæ.**

Portuniens normaux, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, vol. xiv. p. 225, 1860; Archiv. Mus. Hist. Nat., vol. x. pp. 311, 312, 1861.

Carapace moderately transverse, and usually widest at the last antero-lateral marginal spine. Front horizontal, and not spatuliform. Orbits and eye-peduncles of moderate length; the spine or tooth at the exterior angle of the orbit does not project laterally beyond the antero-lateral marginal teeth; of these more than one (usually from five to nine), are developed.

In the following classification, which is a modification of that proposed by A. Milne Edwards, the recent genera of this section are subdivided into four groups or subfamilies.

Subfamily 1. Lupinæ.

Lupéens, Carupiens, Lupocycliens, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 311, 1861.

Carapace transverse, with the antero-lateral margins oblique, and usually armed with more than five (from five to nine) marginal teeth. Basal antennal joint moderately developed. Chelipedes usually elongated. Fifth legs natatorial, with the terminal joint expanded and ovate.

1. Flagellum occupying the interior orbital hiatus.

Genera:—*Neptunus*, de Haan (=*Euctenota*, Gerstæcker; *Posidon*, Herklots, and ?*Arenæus*, Dana), with the subgenera *Amphitrite*, de Haan (=*Pontus*, de Haan), *Achelous*, de Haan, and *Hellenus*, A. Milne Edwards; *Callinectes*, Stimpson; *Xiphonectes*, A. Milne Edwards; *Scylla*, de Haan; ? *Lupocyclus*, Adams and White (with subgenus *Parathranites*, nov.); ? *Carupa*, Dana.

2. Antennal flagellum excluded from the orbital hiatus by a process of the basal antennal joint.

Genera:—*Cronius*, Stimpson; *Goniosoma*, A. Milne Edwards (=*Oceanus*, de Haan; *Charybdis*, de Haan); *Thalamonyx*, A. Milne Edwards.

Subfamily 2. Thalamitinæ.

Thalamitiens, A. Milne Edwards (pt.), Archiv. Mus. Hist. Nat., vol. x. p. 311, 1861.

Carapace widely transverse, antero-lateral margins usually straight, forming a right angle with the front, with few (four or five) teeth. Basal antennal joint greatly developed, widely transverse, flagellum widely excluded from the orbit. Chelipedes moderately elongated. Fifth legs natatorial, as in the Lupinæ.

Genera:—*Thalamita*, Latreille; *Thalamitoides*, A. Milne Edwards; ? *Hedrophthalmus*, Nauck.

Subfamily 3. Carcininæ.

Carciniens, Polybiens, Lissocarciniens, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 311, 1861.

Carapace but slightly (if at all) transverse, with the antero-lateral margins arcuated and armed with five or fewer marginal teeth. Basal antennal joint moderately developed. Chelipedes rather small. Fifth legs natatorial (except in *Carcinus*).

1. Antennæ not wholly excluded from the orbits.

Genera:—*Portunus*, Fabricius (*Liocarcinus*, Stimpson, subgenus ?); *Bathynectes*, Stimpson (=*Thranites*, Bovallius); *Nectocarcinus*, A. Milne Edwards; *Carcinus*, Leach; *Platyonychus*, Latreille (=*Anisopus*, de Haan); *Portumnus*, Leach (=*Xaiva*, MacLeay); *Polybius*, Leach; *Lissocarcinus*, Adams and White.

2. Antennæ wholly excluded from the orbits by the union of the front with the inferior orbital margin.

Genus:—*Cœnophthalmus*, A. Milne Edwards.

Subfamily 4. Caphyrinæ.

Carapace but slightly (if at all) transverse, with the antero-lateral margins arcuated, and armed with only four or five teeth. Basal antennal joint moderately developed.

Fifth legs raised somewhat upon the dorsal surface of the body and subprehensile, with the dactylus styliform and slightly curved.

Genus :—*Caphyra*, Guérin (= *Camptonyx*, Heller). This genus is not represented in the Challenger collection.

Subfamily 1. LUPINÆ.

Neptunus, de Haan.

Neptunus, de Haan, Crust. in v. Siebold, Fauna Japonica, decas i. p. 7, 1833.
„ A. Milne Edwards (pt.), Archiv. Mus. Hist. Nat., vol. x. p. 314, 1861.
Achelous, *Amphitrite*, *Pontus*, de Haan, *tom. cit.*, pp. 8, 9, 1833.
? *Posidon*, Herklots, Addit. Faun. Carcin. Africæ occidentalis, p. 3, 1851.
? *Arenæus*, Dana, Amer. Journ. Sci. and Arts, ser. 2, vol. xii. p. 130, 1851; U.S. Explor. Exped., vol. xiii., Crust. I, p. 290, 1852.
Euctenota, Gerstæcker, Archiv f. Naturgesch., vol. xxii. p. 131, 1856.
Hellenus, A. Milne Edwards (subgenus), Crust. in Miss. Sci. au Méxique, pt. 5, pp. 210, 221, 1879.

Carapace usually transverse, depressed, or even nearly flat, with the dorsal surface granulated, rarely tuberculated, and usually marked with several transverse lines, of which one is prolonged inwards for a short distance from the lateral epibranchial spine. The front projects but little, and is divided into from five to eight lobes or teeth, of which the two exterior constitute the interior lobes of the orbits. The antero-lateral margins are arcuated or nearly straight, and are divided into eight nearly equal and well-developed teeth, including the tooth or lobe at the exterior angle of the orbit, and excluding the ninth or lateral epibranchial spine, which is usually much longer than the preceding antero-lateral teeth; the postero-lateral angles of the carapace are either rounded or angulated or spiniferous. The orbits are widely open above, their superior margins usually marked with fissures, and sometimes dentated, and the infraocular lobe is produced and dentiform or spiniform. The post-abdomen of the male is usually five-jointed (several of the segments coalescent). The eye-peduncles are of moderate size. The basal (or real second) joint of the antennal peduncle is moderately dilated and barely reaches the frontal margin; the flagellum occupies the interior orbital hiatus. The ischium of the outer maxillipedes is usually not at all produced at its antero-internal angle. The endostome is longitudinally ridged (except in the species constituting Dana's genus *Arenæus*). The chelipedes are well developed, sometimes considerably elongated; the merus is armed with spines on its anterior and sometimes on its posterior margin. The carpus and palm are usually longitudinally ridged, and the ridges may terminate in spines; the palm is elongated and somewhat prismatic; the dactyli straight, incurved at the apices, and armed with numerous unequal lobes or tubercles on the inner margins. The ambulatory legs are considerably elongated, with the penultimate and terminal

joints compressed and longitudinally sulcated; in the fifth legs these joints are usually smooth, and as in other Portunidæ, considerably dilated; the terminal joint is oval and lamelliform.[1]

The species of the genus *Neptunus* thus defined are very numerous, and occur in all the warmer temperate and tropical seas of the globe. *Neptunus sayi* is a pelagic and widely-distributed species, occurring commonly on the floating gulf-weed. Most of the species are, I believe, sub-littoral or shallow-water forms; several, however, have been recorded from depths varying between 20 and 50 fathoms, and the remarkable *Neptunus* (*Hellenus*) *spinicarpus* occurs usually at much greater depths, and has been taken by the Challenger off the coast of Brazil in (probably) 350 fathoms.

A. *Neptuni* with the spine on the interior margin of the carpus of the chelipedes normally developed:—

a. Carapace broadly transverse; antero-lateral margins forming with the frontal margin a regular curve with long radius. Lateral epibranchial spine much longer than the preceding tooth.

Subgenus, *Neptunus*.

Neptunes argués, A. Milne Edwards (pt.), Archiv. Mus. Hist. Nat., vol. x. p. 316, 1861.[2]

The following are species belonging to this subgenus, which are not referred to by A. Milne Edwards, or have been described since the publication of his monograph in 1861:—

Neptunus mexicanus (Gerstæcker, as *Euctenota*) = *Arenæus bidens*, T. J. Smith. Mexico; Nicaragua.

Neptunus (?) *pudica* (Gerstæcker). Coast of Brazil. (Perhaps a species of the subgenus *Amphitrite*.)

Neptunus trituberculatus, Miers. China and Japan.[3]

[1] In the species of this genus, the merus of the exterior maxillipedes is of very variable form; it may be (as in the typical species of *Neptunus*, *Neptunus pelagicus*) obliquely truncated at the distal extremity, with the antero-external angle rounded and not at all produced, the antero-internal angle slightly produced and rounded, or, as in the subgenus *Achelous*, de Haan (type *Achelous spinimanus*), more elongated, truncated and produced at neither angle, or, as in the species of the subgenus *Amphitrite*, de Haan (type *Amphitrite gladiator*), the antero-external angle of the merus may be considerably produced and acute. Sometimes, as in *Pontus*, de Haan (type *Pontus convexus* = *Neptunus sieboldi*, A. Milne Edwards), the antero-external angle is a right angle and the merus-joint is quadrate, sometimes, as in *Euctenota*, Gerstæcker (type *Euctenota mexicana*), it is produced and somewhat rounded at the distal extremity.

[2] From this section is excluded the genus *Callinectes*, distinguished by the ⊥-shaped post-abdomen of the male which is regarded as distinct by A. Milne Edwards in his later work, Crust. in Miss. Sci. au Mexique.

[3] *Neptunus madagascariensis*, Hoffmann, is very probably a species of *Callinectes*.

Neptunus (*Neptunus*) *pelagicus* (Linné).

Cancer pelagicus, Linné, Mus. Lud. Ulrici, p. 434, 1764; Syst. Nat., ed. 12, p. 1042, 1766.
Lupa pelagica, Audouin, in Savigny, Descr. de l'Egypte, Crust. Atlas, pl. iii. fig. 1.
Neptunus pelagicus (*partim*), A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 320, 1861.
ers, Ann. and Mag. Nat. Hist., ser. 4, vol. xvii. p. 221, 1876.

Philippine Islands near Masbate (Station 203), lat. 11° 6′ 0″ N., long. 123° 9′ 0″ E., in 20 fathoms (an adult male.)

Adult ♂.	Lines.	Millims.
Length of carapace,	28	59·5
Breadth to base of lateral epibranchial spine,	49½	105

Neptunus (*Neptunus*) *sayi*, A. Milne Edwards.

Lupa pelagica, Say, Journ. Acad. Nat. Sci. Philad., vol i. p. 97, 1817, *nec* Linné.
Neptunus sayi, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 317, pl. xxix. fig. 2, 1861, and references to literature; Crust. in Miss. Sci. au Méxique, pt. 5, p. 210, 1878.

A large series of specimens of this common pelagic species was taken from the gulf-weed in the Western North Atlantic, in April 1873; an adult female in the North Atlantic, May 1876; also an adult male south of Nova Scotia, in lat. 43° 3′ 0″ N., long. 63° 39′ 0″ W., at Station 49, where the depth was 85 fathoms.

The convex, marbled carapace, short lateral epibranchial spine, and the absence of a spine on the posterior margin of the merus of the chelipedes are characteristic of this species.

In the smallest examples in the Challenger series (length of carapace 4½ lines, 9·5 mm., breadth to base of lateral epibranchial spines about 7 lines, 14·5 mm.), the full number of lateral marginal spines is developed, the posterior or epibranchial spine being relatively no larger than in the adult; the frontal teeth are somewhat less prominent and distinct.

The smallest ova-bearing female has the following dimensions:—

♀.	Lines.	Millims
Length of carapace, about	7	15
Breadth to base of epibranchial spine, nearly	11	23

The largest male has the following dimensions:—

Adult ♂.	Lines.	Millims
Length of carapace, about	15½	33
Breadth to base of lateral epibranchial spine, about	25½	54·5

Neptunus (Neptunus) sanguinolentus.

Cancer sanguinolentus, Herbst, Naturgesch. der Krabben u. Krebse, vol. i. p. 161, pl. viii. figs. 56, 57, 1782.

Lupa sanguinolenta, Milne Edwards, Hist. Nat. Crust., vol. i. p. 451, 1834; Atlas in Règne Animal de Cuvier, ed. 3, Crust., pl. x. figs. 1, 8.

Portunus (Neptunus) sanguinolentus, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 8, 1833.

Neptunus sanguinolentus, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 319, 1861; and references to literature.

Specimens were obtained at the following localities:—On the South Australian Coast, 2 to 10 fathoms, April 1874 (a young male); Ternate, October 15, 1874 (a female); Sandwich Islands, off Honolulu, 16 to 20 fathoms (a fine adult male), also several specimens from the market at Honolulu; Hawaii (a male).

Adult ♂.	Lines.	Millims.
Length of carapace,	30	63·5
Breadth to base of lateral epibranchial spine, nearly	53	112

The areolated colour-markings of the carapace may vary in size and distinctness, but the three large, equidistant, irregularly oval and usually ocellated spots which ornament the cardiac and branchial regions are very constant and characteristic of this species.

Carapace narrower; antero-lateral margins forming with the frontal margin an angle or a curve with short radius. Lateral epibranchial spine well developed, as in the typical *Neptuni*.

Subgenus *Amphitrite*.[1]

Neptunes angulaires, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 325, 1861.

The following are species which have been described since the publication of the monograph of A. Milne Edwards in 1861, or are not included in that memoir:—

Neptunus exasperatus (Gerstæcker). Puerto Cabello, Venezuela. (Perhaps a species of the subgenus *Achelous*.)

Neptunus transversus (Stimpson). Mexico; Manzanillo.

Neptunus tumidulus (Stimpson). West of Tortugas and Conch Reef, 37 to 40 fathoms.

Neptunus acuminatus (Stimpson). Panama.

Neptunus panamensis (Stimpson) = *Achelous paucispinis*, Lockington. Panama; California.

Neptunus vocans, A. Milne Edwards. Cape Verde Islands.

Neptunus ventralis, A. Milne Edwards. Guadeloupe.

[1] This name had been previously used by Müller, for a genus of Polychætous Annelida

Neptunus sulcatus, A. Milne Edwards. Guadeloupe, 17 fathoms.
Neptunus inæqualis, Miers. Senegambia, Goree Island.
Neptunus amnicola, Rochebrune. Senegambia, rivers and marshes. (Perhaps a species of the subgenus *Neptunus*.)
Neptunus edwardsii, Rochebrune. Senegambia, rivers.
Neptunus pallidus, Rochebrune. Senegambia, lakes and marshes.
Neptunus tomentosus, Haswell. Port Jackson.
Neptunus spinipes, n. sp. Philippines, 18 fathoms.[1]

Neptunus (*Amphitrite*) *hastatus* (Linné).

Cancer hastatus, Linné, Syst. Nat., ed. 12, p. 1046, 1766.
Lupa dufourii (Desmarest), Roux, Crust. de la Mediterranée, pl. xliv. figs. 1, 6, 1830.
Neptunus hastatus, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 327, 1861, et synonyma.

Four young males obtained off Teneriffe or Gomera, in 75 or 78 fathoms, are referred to this species.[2]

These specimens are very prettily mottled with purple on a yellowish ground; the frontal teeth are less prominent and acute than in adult examples of *Neptunus hastatus*.

In the smallest example, length only about $2\frac{1}{2}$ lines (5 mm.), the full number of antero-lateral marginal teeth are developed.

The largest specimen measures as follows:—

♂.	Lines.	Millims.
Length of carapace, about	$4\frac{1}{2}$	9·5
Breadth of carapace to base of lateral epibranchial spine,	$7\frac{1}{2}$	15·5

Neptunus (*Amphitrite*) *hastatoides* (Fabricius).

Portunus hastatoides, Fabricius, Entom. Syst. Suppl., p. 368, 1798.
Portunus (*Amphitrite*) *hastatoides*, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 9, 39, pl. i. fig. 3 ♂, 1833.
Neptunus hastatoides, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 332, 1861.

South of New Guinea, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E., in 28 fathoms (Station 188), four males and one female; Hong Kong, 10 fathoms (a good series); Kobé, Japan, 8 to 50 fathoms (an adult male); Japanese Seas, lat. 34° 18′ 0″ N., long. 133° 35′ 0″ E. (Station 233B), 15 fathoms (three adult males).

[1] The *Portunus ponticus* of Fabricius (Entom. Syst. Suppl., p. 369, 1798) as described and figured by Herbst, is apparently a species of this subgenus. It is referred to by H. Milne Edwards (Hist. Nat. Crust., vol. i. p. 457, 1837).

[2] There is some discrepancy between the label on the outside of the bottle and the written parchment note of the locality placed within it with the specimens. In the same bottle was an example of the common *Nautilograpsus minutus*, which generally occurs on the floating gulf-weed, perhaps, therefore, the depth is inaccurately noted.

This species is easily recognised by its flattened pubescent carapace, whose postero-lateral angles are spinuliform; the merus or arm of the chelipedes bears two spines on its posterior margin. There is commonly, but not invariably, a dark-coloured spot at the distal extremity of the terminal joint of the fifth leg.

Adult ♂.	Lines.	Millims.
Length of carapace,	7½	16
Breadth of carapace to base of lateral epibranchial spine,	11½	24·5

Adult males and females in the series have, attached to the ventral surface of the abdomen, a Rhizocephalous parasite allied to or identical with *Sacculina*.

Neptunus (*Amphitrite*) *tuberculosus*, A. Milne Edwards.

Neptunus tuberculosus, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 333, pl. xxxi. fig. 5, 1861.

Arrou Island, September 18, 1874 (a small male).

In this specimen the teeth of the antero-lateral margins are somewhat unequally developed, usually alternately larger and smaller; the spines of the chelipedes are very small, that near the wrist being reduced to a tubercle, as in the figure of Milne Edwards.

♂.	Lines.	Millims.
Length of carapace,	4½	10
Breadth of carapace to base of lateral epibranchial spine, nearly	6½	13

Neptunus (*Amphitrite*) *rugosus*, A. Milne Edwards.

Neptunus rugosus, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 335, pl. xxxiii. fig. 3, 1861.

A small male, obtained in Torres Strait (August 1874), and an adult male dredged at the Philippines, lat. 11° 37′ 0″ N., long. 123° 31′ 0″ E., in 18 fathoms (Station 208), are referred to this species; also a female dredged in the Celebes Sea, in 10 to 20 fathoms, lat. 6° 54′ 0″ N., long. 122° 18′ 0″ E. (Station 212).

The two latter are distinguished from the types of Milne Edwards' description and figure, from Shark Bay, West Australia (preserved in the collection of the British Museum), by the much less strongly and distinctly tuberculated carapace, the much shorter lateral epibranchial spine, and the longer chelipedes, distinctions which I suppose to be due to the greater age of the Challenger specimens.

This species is distinguished (as pointed out by Professor A. Milne Edwards) from all of its congeners, except *Neptunus tenuipes*, de Haan, by having only five frontal teeth, and from *Neptunus tenuipes* by the dentiform, not rounded, postero-lateral angles of the carapace. Except in this latter important character, the adult Challenger specimens

more nearly resemble *Neptunus tenuipes* than *Neptunus rugosus*, and a sufficient series of specimens would perhaps establish the identity of the two species.

The dimensions of the specimen from the Philippines are as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace, ...	8	17
Breadth to base of lateral epibranchial spine, ...	11	23·5

Neptunus (*Amphitrite*) *gladiator* (Fabricius).

Portunus gladiator, Fabricius, Entom. Syst. Suppl., p. 368, 1798.
,, (*Amphitrite*) *gladiator*, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 9, 39, pl. i. fig. 5 ♂, 1833.
Neptunus gladiator, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 330, 1861, et synonyma.

South of New Guinea, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E., in 28 fathoms (Station 188). Two adult males.

Adult ♂.	Lines.	Millims.
Length of carapace, ...	18	38·5
Breadth to base of lateral epibranchial spine, nearly . . .	27½	58

In this species the postero-lateral angles of the carapace are rounded, not dentiform, the median are shorter than the submedian frontal teeth, and there are two spines on the posterior margin of the merus of the chelipedes.

Neptunus (*Amphitrite*) *gladiator*, var. *argentatus* (White).

Amphitrite argentata, White, List Crust. Brit. Mus., p. 126, 1847, *descript. nulla.*
Neptunus argentatus, A. Milne Edwards, *tom. cit.*, p. 332, pl. xxxi. fig. 4, 1861.

Of this variety, which is scarcely distinguishable from the typical *Neptunus gladiator*, except by the more rudimentary frontal teeth and somewhat narrower carapace, and which I think to be founded on younger examples of Fabricius' species, a female was dredged in the Celebes Sea in 10 to 20 fathoms, lat. 6° 54′ 0″ N., long. 122° 18′ 0″ E. (Station 212).

♀.	Lines.	Millims.
Length of carapace, ...	8	17
Breadth of carapace, ...	11½	23·5

I should add, that in all the specimens I have seen of this variety, the terminal joint of the fifth legs is marked with a very distinct purple or reddish spot, which is very obscurely indicated in, or absent from the specimens of the typical *Neptunus gladiator* I

have examined, which have, however, a similar spot on the preceding (penultimate) joint of the same legs, but as these colour-markings apparently vary in other species (as *e.g.*, *Neptunus* (*Amphitrite*) *hastatoides*) they can scarcely be regarded as evidencing the distinctness of *Neptunus gladiator* and *argentatus*.

Neptunus (*Amphitrite*) *spinipes*, n. sp. (Pl. XV. fig. 1).

The carapace is rather narrow and convex for a species of this genus, its surface is everywhere rather obscurely granulated, and is covered with inequalities or rounded prominences, which are most distinctly developed on the cardiac and branchial regions. The front is armed with six teeth, the median and submedian projecting much more than the lateral teeth, and separated from one another by a concave interspace; the median and lateral (or inner orbital) teeth are small and dentiform, the submedian teeth larger and triangulate. The antero-lateral marginal teeth are small (the two following the exterior orbital tooth the smallest), and are dentiform rather than spiniform; the lateral epibranchial spine (in the largest example), scarcely exceeds one-fifth the greatest width of the carapace; the postero-lateral margins are concave, and form nearly a right angle at their junction with the straight posterior margin, but the postero-lateral angles are not spinuliferous, as in *Neptunus hastatoides;* the orbits are deep, in a dorsal view almost semicircularly concave; the sternal surface of the body is polished and very distinctly granulated; the post-abdomen (in the male) is very narrow in its distal half, and composed of only five distinct joints, the second and third, and the fourth and fifth segments having coalesced. The eyes are large and short; the basal antennal joint barely reaches the subfrontal process, and does not reach to the apex of the inner suborbital lobe of the orbit; the outer maxillipedes are rather thinly clothed with longish hairs, which also extend over the subhepatic and pterygostomian regions of the body; the merus of the outer maxillipedes is narrowed towards its distal extremity, which is rounded. The chelipedes are subequal, very obscurely granulated, and covered with a close whitish pubescence; the merus is armed with three spines on its anterior margin, and two on its posterior margin (whereof one is at the distal extremity), the carpus with a spine on its inner margin, and one on its outer surface, the palm with two spines on its supero-internal margin (whereof the distal one is small and placed just above the base of the dactyl), and one at the base near the articulation with the wrist; both dactyl and pollex are straight, closely denticulated on their inner margins, and incurved at the tips. The second to the fourth legs are slender, compressed, and have the inferior margins of the penultimate joints and dactyli fringed with close-set hairs; the fifth (swimming) legs are moderately robust, the merus-joints are armed with a spine at the distal end of its posterior margin, and the terminal joints rather narrow-ovate and ciliated on the margins.

Colour (in spirit) brownish-pink, the close short pubescence with which the carapace and limbs are covered, whitish.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	7	14·5
Greatest breadth of carapace, nearly	9	18·5
Length of a chelipede,	15	32
Length of first ambulatory leg,	14	30

Philippines, 18 fathoms, lat. 11° 37′ 0″ N., long. 123° 31′ 0″ E. (Station 208). Two males and a young female were collected.

This species is distinguished from nearly all its Oriental congeners known to me by the presence of a spine at the distal end of the inferior margin of the merus-joint of the fifth ambulatory legs. It is allied in this particular to *Neptunus sebæ* (Milne Edwards),[1] and several other American species, from which it is distinguished by the existence of two spines on the posterior margin of the merus of the chelipedes, the form of the frontal teeth, &c.

It is also nearly allied to the Oriental *Achelous whitei*, A. Milne Edwards,[2] from which it is distinguished not merely by the longer epibranchial spine, but also by the different arrangement of the spines on the palm of the chelipedes, &c.

c. Carapace as in the subgenus *Amphitrite* or even narrower; lateral epibranchial spine no longer or very little longer than the preceding tooth of the antero-lateral margin.

Subgenus *Achelous*, de Haan.

Achelous, de Haan, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 340, 1861.

To the species enumerated by A. Milne Edwards, the following is to be added:—

Neptunus unispinosus, Miers. North Australia (Prince of Wales' Channel, Torres Strait).

Neptunus (*Achelous*) *whitei* (A. Milne Edwards).

Achelous whitei, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 343, pl. xxxi. fig. 6, 1861.

South of New Guinea, 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (Station 188). A large series was collected.

[1] *Vide* A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 329, pl. xxviii. fig. 2, 1861.

[2] *Tom. cit.*, p. 343, pl. xxxi. fig. 6, 1861.

An adult male measures as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace,	11	23·5
Breadth to base of lateral epibranchial spine,	15½	32·5

This species, together with *Neptunus* (*Achelous*) *spinimanus* and *Neptunus unispinosus*, might be placed with almost equal justice in the subgenus *Amphitrite*, since in these forms the lateral epibranchial spine is distinctly longer than the preceding.[1]

Neptunus (*Achelous*) *granulatus* (Milne Edwards).

Lupa granulata, Milne Edwards, Hist. Nat. Crust., vol. i. p. 454, 1834.
Portunus (*Amphitrite*) *gladiator*, de Haan (*not* Fabricius), Crust. in v. Siebold, Fauna Japonica, p. 65, pl. xviii. fig. 1, 1837; *not* p. 39, pl. i. fig. 5.
Achelous granulatus, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 344, 1861, et synonyma.

Samboangan, Philippines, 10 fathoms (a male); Admiralty Islands, 16 to 25 fathoms (a male).

♂.	Lines.	Millims.
Length of carapace,	7½	15·5
Breadth to base of lateral epibranchial spine,	9½	20·5

Neptunus (*Achelous*) *unispinosus* (Miers).

Achelous granulatus, var. *unispinosus*, Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 230, pl. xxiii. fig. B, 1884.

The carapace is rather narrow and moderately convex, with obscure rounded prominences which are granulated, and is everywhere covered with a short close pubescence; the postero-lateral angles are rounded. The front is six-toothed; the median and submedian somewhat more prominent than the lateral teeth, the median teeth smaller, but not less prominent than the submedian teeth; all are distally rounded, not acute at the apices. The antero-lateral marginal teeth are small and acute; the lateral epibranchial spine small, but very distinctly longer than the preceding antero-lateral teeth. The post-abdomen of the male is composed of five to seven distinct segments, and is narrowed from the base of the penultimate segment; the eyes are large, and are borne on very short peduncles. The basal antennal joint is short and rather broad, but reaches the lateral subfrontal process; the ischium-joint of the outer maxillipedes is longitudinally sulcated; the merus subtruncated at its distal extremity. The chelipedes (in the male) are subequal and rather short; the merus-joint (arm) has three or four

[1] In a small specimen of *Achelous whitei* in the collection of the British (Natural History) Museum, the lateral spine is as long as in many species of the subgenus *Amphitrite*. I prefer, however, to retain these species in the position assigned to them by A. Milne Edwards for this reason, if for no other, that were *Amphitrite spinimanus* removed from *Achelous* it would be necessary to rename this subgenus, of which it is the original type.

spinules on its anterior margin, and one at the distal extremity of its posterior margin; the wrist has a small spinule on its inner margin and another on its outer surface; the palm is longitudinally costated on its upper and outer surface, and is armed with two small spinules, one, basal, near the articulation with the wrist, and one close to the distal end of the upper margin, near the articulation with the dactylus; the dactyl and pollex are barely as long as the palm and are denticulated on their inner margins. The ambulatory legs are very slender and compressed; the dactyli longer than the penultimate joint; the posterior or swimming legs are of moderate length, their merus-joints smooth, without spinules, the terminal joints rather narrow, ovate. Colour (in spirit) light yellowish-brown, the pubescence whitish. The dimensions of a Challenger specimen are :—

♂.	Lines.	Millims.
Length of carapace, nearly	6	12
Breadth to base of lateral epibranchial spine, nearly	8	16·5
Length of a chelipede,	11	23 •
Length of first ambulatory leg, about	9½	20·5

Two small males were collected in the Torres Strait, one of these at Station 186, in 8 fathoms, lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E.

This species is not easily confounded with any of its Oriental congeners. From *Neptunus* (*Achelous*) *granulatus*, as I have shown, it is distinguished by having but a single spine on the posterior margin of the arm, by the less spiniform antero-lateral marginal teeth, &c. Its nearest ally in the subgenus *Achelous* is apparently the American *Neptunus* (*Achelous*) *depressifrons*; in which species, however, the lateral epibranchial spine is shorter, and the spine on the upper margin of the palm of the chelipedes is placed further back from the distal extremity, &c. From such species of the subgenus *Amphitrite* (also American), as are allied to it in the rounded postero-lateral angles of the carapace, unarmed merus-joint of the swimming legs, &c. (*e.g.* *Neptunus* (*Amphitrite*) *gibbesii*), it is distinguished by the form of the frontal teeth, and the shorter lateral epibranchial spine.

Neptunus (*Achelous*) *depressifrons* (Stimpson).

Amphitrite depressifrons, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 58, 1859.
Achelous depressifrons, Stimpson, *tom. cit.*, p. 223, 1860.
" " A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 342, 1861; Crust. in Miss. Sci. au Méxique, pt. 5, p. 230, pl. xl. fig. 4, 1879.

Bermuda (shore). An adult male.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	7	14·5
Breadth of carapace to base of lateral epibranchial spine, nearly	9½	19·5

In this specimen the palms and merus-joints of the chelipedes are more elongated than in the figure of A. Milne Edwards, and the spine at the distal extremity of the posterior margin of the merus-joint is obsolete. The lateral epibranchial spine does not at all exceed the preceding spine in length, and in this character, as well as in those of the chelipedes, this specimen differs from authentically-named examples of *Neptunus depressifrons* in the collection of the British (Natural History) Museum. It may be that these characters will prove, upon examination of a sufficient series, sufficient to separate the Bermuda swimming-crab as a distinct species from *Neptunus depressifrons*.

B. *Neptuni* with the spine on the inner margin of the carpus abnormally developed (in the adult male exceeding the palm in length) :—

Subgenus *Hellenus*, A. Milne Edwards.

Hellenus, A. Milne Edwards (pt.), Crust. in Miss. Sci. au Méxique, pt. 5, pp. 210, 221, 1879.

In the single species which follows, to which I propose to restrict this subgenus, there is scarcely any trace of a spine or tooth at the postero-lateral angles of the carapace, and I am inclined to think that the form of the postero-lateral angles cannot be regarded as affording a character of importance sufficient to distinguish the subgenus.

Neptunus (*Hellenus*) *spinicarpus* (Stimpson).

Achelous spinicarpus, Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 148, 1870.
Neptunus (*Hellenus*) *spinicarpus*, A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 221, pl. xl. fig. 1, 1879.

Brazil, off Barra Grande, lat 9° 5′ 0″ S. to 9° 10′ 0″ S., long 34° 49′ 0″ W. to 34° 53′ 0″ W., in from 32 to 400 fathoms (Stations 122 to 122c). An adult male and two adult and one young females are in the collection.

In none of the females does the spine on the inner margin of the wrist, although greatly developed, reach the distal extremity of the upper margin of the palm; in the adult male it is far larger, reaching nearly to the middle of the dactylus, or mobile finger, and is considerably dilated and strongly compressed, and bordered on its outer margin with a fringe of long hairs; the carapace also is provided with stronger rounded prominences on the cardiac and branchial regions in the male than in the females.

The dimensions of this specimen are as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace,	8½	18
Breadth to base of lateral epibranchial spine,	12	25
Length of a chelipede,	22½	45·5
Length of spine on the inner margin of the wrist,	9	19
Length of first ambulatory leg,	17	36

Xiphonectes, A. Milne Edwards.

Xiphonectes, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 157, 1873.

This genus, established by A. Milne Edwards for certain small species which have much the appearance of *Neptuni* which have not attained their full development, is distinguished from *Neptunus* (subgenus *Amphitrite*) by the following characters:—

The carapace is narrower than is usual in *Amphitrite*, the lateral epibranchial spine even more developed, and the lateral (or submedian) frontal lobes more prominent. The antero-lateral marginal teeth are spiniform, more remote from one another, and very rarely attain the number eight (exclusive of the lateral epibranchial spine) characteristic of *Amphitrite*. The orbits and eyes are very large.

An examination of the series in the British (Natural History) Museum and Challenger collections, shows, I think, that the various described species of this genus must be regarded as varieties of one widely distributed type, which occurs throughout the Indo-Pacific region in water of only moderate depth (to 18 fathoms).

Xiphonectes longispinosus (Dana).

Amphitrite longispinosa, Dana, Proc. Acad. Nat. Sci. Philad., p. 84, 1852; U.S. Explor. Exped., vol. xiii. Crust. 1, p. 277, pl. xvii. fig. 2, 1852.

Amphitrite vigilans, Dana, *tom. cit.*, p. 278, pl. xvii. fig. 3, var.

Neptunus vigilans and *longispinosus*, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. pp. 336, 337, 1861.

? *Xiphonectes leptocheles*, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 159, pl. iv. fig. 1, 1873, var.

Neptunus vigilans, Richters, Decapoda in Möbius Beitr. zur. Meeresfauna der Mauritius und der Seychellen, p. 152, 1880.

Xiphonectes vigilans, var. *obtusidentatus*, Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 538, pl. xlviii, fig. A, 1884.

Tongatabu, 18 fathoms (Station 172), lat. 20° 58′ 0″ S., long. 175° 9′ 0″ E. Two small males.

These specimens offer a curious intermixture of the characters cited as characteristic of each of the supposed species, *Xiphonectes longispinosus*, *Xiphonectes vigilans*, and *Xiphonectes leptocheles*. In the larger specimen, the chelipedes are comparatively robust as in the typical *Xiphonectes longispinosus*, in the smaller they are slender and elongated as in *Xiphonectes leptocheles*. In the larger specimen the arm or merus has four spines on its anterior (or inner) margin, as in the typical *Xiphonectes vigilans*, but the six spines of the antero-lateral margins are equidistant, as in *Xiphonectes longispinosus*. In the smaller specimen there are five spines on the anterior margin of the arm. In both specimens the post-abdomen is composed of only five distinct segments; in the larger specimen, with robust chelipedes, the sixth segment is more nearly of the form figured by

Milne Edwards as characteristic of his *Xiphonectes leptocheles* than in the smaller specimen with slender chelipedes.[1]

The dimensions of the specimens are as follows:—

♂.	Lines.	Millims.
Length of carapace, about	4	9
Breadth of carapace, nearly	4½	9·5
Length of lateral spine, nearly	3	6
Length of a chelipede, about	9	19
Young ♂.		
Length of carapace, nearly	3	6
Breadth of carapace, nearly	3½	7·5
Length of lateral spine, about	2½	5
Length of a chelipede, about	8	17·5

Scylla, de Haan.

Scylla, de Haan, Crust. in v. Siebold, Fauna Japonica, decas i. p. 11, 1833.
„ A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 347, 1861.

This genus is very nearly allied to *Neptunus*, but is distinguished by its smoother, more convex carapace, which is not marked by the transverse raised lines which are characteristic of that genus, except by one on each side which are prolonged inwards for a short distance from the base of the lateral epibranchial tooth. The front is armed with six lobes or teeth, which are much more prominent in the young than in the adult animal. The antero-lateral margins are oblique, as in the typical *Neptuni*, and are armed with nine lobes or teeth, but the last (lateral epibranchial) tooth is not at all longer than those which precede it. The epistoma is distinctly developed. The post-abdomen in the male is subtriangulate, with the lateral margins nearly straight and convergent from the anterior margin of the third segment, which, with the fourth and fifth, is consolidated into a single joint. The eye-peduncles are of moderate thickness. The basal antennal joint is somewhat dilated, and barely reaches the front, it is prolonged at its antero-external angle into a lobe, which does not, as in *Gonisoma*, exclude the flagellum from the orbital hiatus. The merus of the exterior maxillipedes is obliquely truncated at the antero-internal angle, slightly rounded at the distal extremity, with the antero-external angle but little prominent and subacute. The chelipedes in the adult male are large and massive, and sometimes unequally developed; merus, carpus, and palm, are armed with spines, but the exterior surface of the carpus and palm are not longitudinally cristated as in *Neptunus*, and the palm is shorter and more turgid, the fingers strongly toothed on the inner margins, and the dactylus distinctly arcuated. The ambulatory

[1] In the Report on the Crustacea of H.M.S. "Alert," before seeing the Challenger specimens, I regarded the three described species of *Xiphonectes* as distinct.

legs present nothing remarkable; the merus-joint of the fifth (natatory) legs is not armed with a spine on its inferior margin.[1]

The only recent species of this genus is the very common and widely distributed Indo-Pacific species which follows:—

Scylla serrata (Forskål).

Cancer serratus, Forskål, Descript. animalium quæ in itinere orientali observavit P. Forskål, p. 90, 1775.
Portunus (*Scylla*) *serratus*, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 44, 1835.
Scylla serrata, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, Zool., xiv. p. 252, pls. i., ii., 1860; Archiv. Mus. Hist. Nat., vol. x. p. 349, 1861, et synonyma.

Tahiti, Papiete. An adult female and a smaller male.

♂.	Lines.	Millims.
Length of carapace, about	27	57·5
Breadth of carapace, nearly	37½	79

Lupocyclus, Adams and White.

Lupocyclus, Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 47, pl. xii. fig. 4, 1848.
„ A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 387, 1861.

Carapace transverse, but little broader than long; the antero-lateral margins armed with five regular and even teeth, between which may alternate several smaller teeth; the last antero-lateral tooth may be (subgenus *Parathranites*) elongated and laterally porrected; the front is narrow, moderately prominent, and four to six-lobed. The orbital fissures are very distinct. The longitudinal ridges of the endostome or palate are distinctly defined; the post-abdomen may have, as in so many Portunidæ, two or three of the intermediate segments coalescent. The eyes are set on very short pedicels. The basal antennal joint is free, neither united with the front nor with the interior wall of the orbit, it is narrow or moderately dilated, not produced at the antero-external angle, and lies within the interior orbital hiatus. The ischium of the exterior maxillipedes is not produced at its antero-internal angle; the merus is somewhat elongated, and rounded or subtruncated at the distal extremity, but little, if at all, emarginated at the antero-internal angle. The chelipedes are subequal and moderately slender, the joints are armed with spines, and the palms are externally costated. The ambulatory legs of the second, third, and fourth pairs are slender, and the dactyli are styliform; in the fifth legs the penultimate and terminal joints are dilated, and the terminal joints ovate, as in other Portunidæ.

[1] In this genus the longitudinal ridges of the epistoma are sometimes partially or obscurely developed. The epistoma is transversely sulcated, but this sulcus, upon which much stress is laid by A. Milne Edwards as a generic character, is not always very distinct.

From the European and East American genus *Bathynectes*, Stimpson,[1] with which *Thranites*, Bovallius, is I think, synonymous,[2] this genus is distinguished by the more elongated and less squarely truncated apex of the merus of the exterior maxillipedes, and by the more dilated and ovate dactylus of the fifth ambulatory legs.

Besides the Australian and Malayasian *Lupocyclus rotundatus*, Adams and White, the only species referable, as far as I know, to this genus is the *Lupocyclus philippinensis*, Nauck, and the one described below, which differs from the type and approaches *Bathynectes* in the more elongated and lateral epibranchial tooth of the carapace, and the short chelipedes, on which account I refer it to a new subgenus.

Lupocyclus (*Parathranites*) *orientalis*, n. sp. (Pl. XVII. fig. 1).

The carapace is hexagonal, broader than long; its upper surface is rather coarsely granulated and tuberculated; the tubercles disposed as follows:—one on the gastric and two on the cardiac region, and on either side of the gastric and cardiac tubercles usually three smaller prominences, in a longitudinal series; the front is rather narrow (as in *Lupocyclus rotundatus*), and has four small spinuliform teeth, the two median of which, in the adult, are usually more prominent than the lateral teeth, which are at the inner angle of the orbit. The antero-lateral margins are arcuated and divided into five teeth, the first four of which are broad and equidistant (shaped much as in *Platyonychus bipustulatus*), the last is spiniform and laterally porrected; the concave postero-lateral margins terminate in a small spinule at the postero-lateral angles of the carapace; the upper margins of the orbits are divided by two narrow fissures (as in *Lupocyclus rotundatus*), the inferior margin is emarginate below the tooth at the exterior orbital angle. The pterygostomian regions are granulated. The narrow transverse epistoma is shaped nearly as in *Lupocyclus rotundatus*. The terminal segment of the post-abdomen is longer than broad, and narrower at its base than the penultimate segment. The eyes are rather small. The basal joints of the antennules are broadly dilated, as in *Lupocyclus rotundatus*, and are distally truncated or slightly concave. The slender and narrow basal joint of the antennæ is not in contact with the basal antennulary joint or with the margin of the wide orbital hiatus, and does not attain the apex of the inner subocular lobe of the orbit; the two following joints are slender and rather short, the flagellum moderately elongated. The outer maxillipedes are granulated on their exterior surface; the ischium is elongated and longitudinally sulcated, the merus narrowed to its distal extremity, which is rounded; the narrow and straight exognath reaches the distal extremity of the merus-joint. The chelipedes are of moderate size; the trigonous merus-joint is armed commonly with a single spine on its anterior margin, and two on

[1] *Bull. Mus. Comp. Zoöl.*, vol. ii. p. 145, 1870.

[2] *Öfversigt k. Vetensk.-Akad. Förhandl.*, vol. xxxiii. No. 9, p. 59, pls. xiv., xv., 1876; *op. cit.*, vol. xxxviii. No. 2, p. 9, pl. ii., 1881.

its posterior margin, of which one is near, and the other at, the distal extremity; the carpus has a long spine on its inner margin, and its outer surface is externally granulated and bears a small spine and two or three spinules; the palm is about as long as the merus and is externally granulated and bears three spines, one of which is placed near the base, one at, and the third near, the distal extremity; the fingers about equal the palm and are denticulated nearly as in *Lupocyclus rotundatus*. The ambulatory legs are slender and smooth, with the penultimate joints compressed, the dactyli compressed and not greatly exceeding the penultimate joints in length. The swimming legs have the penultimate and terminal joints dilated and compressed, the terminal joint, as already stated, regularly ovate, and distally rounded. Colour (in spirit) yellowish-brown.

The dimensions of an adult male are as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace,	7	15
Breadth to base of lateral spines,	8½	18
Length of chelipede,	11½	24·5
Length of first ambulatory leg,	14	29·5
Length of swimming leg,	9½	20

Several males and females were collected near the Ki Islands, in 140 fathoms (Station 192), in lat. 5° 49′ 15″ S., long. 132° 14′ 15″ E., and an adult male, north of the Admiralty Islands, in 150 fathoms (Station 219), in lat. 1° 54′ 0″ S., long. 146° 39′ 40″ E.

In the male from the Admiralty Islands the two median frontal lobes are somewhat more prominent than in the specimens dredged at Station 192. The tubercles of the dorsal surface of the carapace are most distinct in the smallest specimens.

This species is at once distinguishable from the *Lupocyclus philippinensis*, Semper (*ined.*), Nauck, by the five-toothed antero-lateral margins of the carapace and the shorter chelipedes.

Cronius, Stimpson.

Cronius, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 225, 1860.
„ A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 231, 1879.

This genus includes certain species formerly referred to *Amphitrite*, *Achelous*, and *Goniosoma*, in which the antero-lateral margins of the carapace are armed with eight alternately larger and smaller teeth, besides the lateral epibranchial tooth, which scarcely exceeds in length the larger teeth of the antero-lateral margins. As in many species of *Goniosoma*, the frontal margin is six to eight-lobed. The endostome or palate is obscurely longitudinally ridged, and the post-abdomen in the male is five-jointed (in the specimens I have examined). The flagellum of the antennæ is excluded, as in *Goniosoma*, from the

interior orbital hiatus by a process of its extero-distal angle, but this process is not in contact with the inferior margin of the front. The chelipedes and ambulatory legs present nothing remarkable; the merus-joints of the fifth legs are armed with a spine placed near the distal extremity of the inferior margin.

Cronius is connected with *Goniosoma* through such species as *Goniosoma erythrodactylum*, which has fewer antero-lateral marginal teeth, but one or two rudimentary as in *Cronius*.

The following species are included in *Cronius*:—

Cronius ruber (Lamarck) = *Amphitrite edwardsii*, Lockington. Gulf of Mexico; West Indies; Vera Cruz; Brazil; Panama (East Coast); Mazatlan.

Cronius milleri (A. Milne Edwards). Cape Verde Islands (St. Vincent); Senegambia, Goree Island, 9 to 15 fathoms.

Cronius bispinosus, n. sp. Brazil, Bahia.

Cronius bispinosus, n. sp. (Pl. XV. fig. 2).

I propose to designate thus a small species which is distinguished from all its congeners by having but two spines on the palm of the chelipedes, and from all, except perhaps *Cronius edwardsii* (Lockington), by having the third frontal tooth in the adult wholly confluent with and indistinguishable from the external frontal (or inner orbital tooth). In nearly all other characters this species closely resembles the well-known *Cronius ruber*,[1] but it is further distinguished by the unarmed merus-joint of the fifth or swimming legs from that species. The carapace is shaped nearly as in *Cronius ruber;* it is moderately convex, pubescent, and has straight, transverse, smooth lines or low ridges on the gastric and cardiac regions, and a similar but curved ridge passing inwards along the front of the branchial regions from the lateral epibranchial spine. The frontal lobes are somewhat broader, less prominent and more obtuse than in *Cronius ruber*, the median ones are separated from one another by a much shallower interspace, the next on each side are as broad as long, and subtruncated or but slightly rounded at the distal extremity, the third, as already stated, are wholly confluent with the outer teeth, and they form together a broad truncated lobe. The antero-lateral margins are armed with eight alternately larger and smaller spines, as in *Cronius ruber*, but the first two teeth are somewhat blunter and less spiniform than in that species; the ninth (or lateral epibranchial spine) is distinctly longer than any of the preceding. As in *Cronius ruber*, the basal antennal joint terminates in a short spine or tooth. The outer maxillipedes closely resemble those of that species. The chelipedes are subequal; the merus or arm has but four spines on its anterior margin; the small spines which usually exist at the distal extremity of both the anterior and posterior margins of the arm in

[1] *Vide* A. Milne Edwards, Crust. in Miss. Sci. au Méxique, pt. 5, p. 232, 1879.

Cronius ruber, are wanting in *Cronius bispinosus;* the wrist is armed with two spines as in *Cronius ruber*, the palm also has but two spines, one basal, close to the articulation with the wrist, and one on the upper margin, placed some distance behind the distal extremity.

The ambulatory and swimming legs are nearly as in *Cronius ruber*, but the spine which exists in *Cronius ruber*, at the distal end of the posterior margin of the merus-joint of the swimming legs, is absent in *Cronius bispinosus*. Colour light reddish or yellowish-brown.

♀.	Lines.	Millims.
Length of carapace,	8	17
Breadth of carapace to base of lateral epibranchial spine,	10½	22
Length of a chelipede,	14½	31
Length of second ambulatory leg,	12½	26·5

Two adult females were collected at Bahia in shallow water.[1]

Goniosoma, A. Milne Edwards.

Goniosoma, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, Zool., xiv. p. 263, 1860; Archiv. Mus. Hist. Nat., vol. x. p. 367, 1861.

Oceanus, *Charybdis*, de Haan, Crust. in v. Siebold, Fauna Japonica, decas i. pp. 9, 10, 1833, names previously used.[2]

Carapace depressed, more or less hexagonal, usually marked, as in other Portunidæ, with raised lines, one of which is prolonged inwards from the base of the lateral epibranchial tooth towards the gastric region; the antero-lateral margins are oblique, slightly arcuated or nearly straight, they form an obtuse angle with the front and orbits, and are usually armed with five or six teeth (inclusive of the exterior orbital but exclusive of the lateral epibranchial tooth), one or two of which may be rudimentary. The front is nearly always divided into eight lobes or teeth (including the tooth at the interior angle of the orbit). The orbits are large, open above and have usually two fissures in the upper margin and another in the lower margin, the interior subocular lobe of the orbit is sometimes, but not always, produced and spiniform. The longitudinal ridges of the endostome are usually distinctly developed. The post-abdomen is composed of five or (rarely) of six joints (two or three of the intermediate segments being consolidated). The eyes are set on short, thick pedicels. The antennæ have the basal joints enlarged

[1] It may be of interest to note here that in a very small male *Cronius milleri* from Senegambia (length only 3½ lines, or little over 7 mm.), in the collection of the British Museum, the submedian and external frontal teeth are confluent, as in *Cronius bispinosus*, but in this specimen the four spines of the palm of the chelipedes are all perfectly distinguishable. I have examined a small male example of *Goniosoma bispinosum* from Brazil, in the British Museum, from the collection of my late grandfather, J. Miers, F.R.S.

[2] It should be noted that the name *Charybdea* used in 1809 by Péron and Lesueur, is spelt somewhat differently from de Haan's designation *Charybdis;* I think it better, however, to retain Milne Edwards' designation for the species of this genus, which has been generally adopted.

(but not so greatly as in *Thalamita*), and their extero-distal angles are considerably produced, the process thus constituted fills the interior hiatus of the orbit and thus excludes the flagellum from the orbit, and is usually in contact with the front. The ischium of the endognath of the exterior maxillipedes is not produced at its antero-internal angle; the merus has its antero-external angle more or less produced, and rounded or subacute, it is distally truncated, and its antero-internal angle is obliquely truncated or slightly emarginate. The chelipedes (in the adult male) are subequal and often considerably developed, as in other Portunidæ; the joints are armed with spines; the palms are often longitudinally costated on their exterior surface, and the fingers are straight and armed with unequal lobes or teeth on their inner margins. The ambulatory legs present nothing remarkable; the merus-joints of the fifth (or natatory) legs are usually armed with a spine placed near the distal extremity of the inferior margin.

The described forms are rather numerous and occur commonly in the littoral or shallow waters of the Indo-Pacific region, but I am not aware that any have been recorded from water of a greater depth than 50 fathoms.

The following are species of this genus which have been described since the publication of A. Milne Edwards' Monograph in 1861 :—

Goniosoma hellerii, A. Milne Edwards. Indian Archipelago (Nicobars); New Caledonia.

Goniosoma acutum, A. Milne Edwards. Japan.

Goniosoma longifrons, A. Milne Edwards. Samoan Islands, Upolu.

Goniosoma acutifrons, de Man. Timor.

Goniosoma spiniferum, Miers. North-East Australia, Port Molle; South Formosa (Coll. Brit. Mus.). This species is perhaps a variety of *Goniosoma variegatum*.

The *Goniosoma dubium*, of Hoffman, from Réunion and Timor, is, according to de Man (Notes Leyden Mus., v. p. 151, 1883), identical with *Goniosoma orientale*, Dana.

Goniosoma variegatum (Fabricius).

Portunus variegatus, Fabricius, Entom. Syst. Suppl., p. 364, 1798.
„ „ Milne Edwards, Hist. Nat. Crust., vol. i. p. 465, 1834.
Charybdis variegatus, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 10–42, pl. i. fig. 2, 1835.
Goniosoma variegatum, Miers, Proc. Zool. Soc. Lond., p. 33, 1879; Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 232, 1884, et synonyma.

I have already, in the Report cited above, given a detailed description of the species I suppose to be *Goniosoma variegatum* (Fabricius).

Certain specimens in the Challenger series apparently belong to a new variety of this form which I propose to designate :—

Goniosoma variegatum, var. *bimaculatum*, nov. (Pl. XV. fig. 3).

The specimens thus designated come in nearly all of their characters very near to the form I regard as the typical *Goniosoma variegatum* (Fabricius)[1] (*Goniosoma callianassa*, A. Milne Edwards), which they resemble in the prominent and laterally-projecting lateral epibranchial tooth, in the turgid three-spined palms of the chelipedes, &c., but are distinguished by having the median and submedian frontal teeth nearly wholly coalescent, and forming together a broad lobe with slightly concave anterior margin, and in having a very distinct black spot on each branchial region.

Japan, Kobé, 50 fathoms. Four adult males were collected.

Adult ♂.	Lines.	Millims.
Length of carapace, about	9½	20
Breadth of carapace, nearly	13	27

Goniosoma cruciferum[2] (Fabricius), A. Milne Edwards.

Cancer cruciatus, Herbst, Naturgesch. der Krabben u. Krebse, ii. Heft. v. p. 155, pl. viii. fig. 53, pl. xxxviii. fig. 1, 1794.
Portunus crucifer, Fabricius, Entom. Syst. Suppl., p. 364, 1798.
Goniosoma cruciferum, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 371, 1861, and references to literature.

Hong Kong, 7 fathoms, from the trawl (a fine adult male).

In this specimen the frontal teeth are all prominent and well developed; the first of the antero-lateral marginal teeth (or exterior orbital tooth) has a distinctly excavated apex.

Adult ♂.	Lines.	Millims.
Length of carapace,	30	63·5
Breadth of carapace, about	40½	86·5

Goniosoma ornatum, A. Milne Edwards.

Portunus (*Thalamita*) *truncatus*, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 10, 43, pl. ii. fig. 3 (*junior*), pl. xii. fig. 3, adult ♂, ♀, 1835, *nec Portunus truncatus*, Fabricius.
Goniosoma ornatum, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 376, 1861.

Arafura Sea, lat. 8° 56′ 0″ S., long. 136° 5′ 0″ E., in 49 fathoms (Station 190). An adult ova-bearing and an immature female.

[1] Fabricius' description of his *Portunus variegatus* is very brief, and the identification of the species, therefore, difficult. H. Milne Edwards, however (Hist. Nat. Crust., vol. i. p. 465, 1834), supposes it to be "*une espèce très-variée*" of *Goniosoma callianassa* (Herbst), and as Fabricius' name has priority, I adopt it in preference to Herbst's designation. By de Haan (Crust. in v. Siebold, Fauna Japonica, p. 42, pl. i. fig. 2, 1835), *Portunus variegatus*, Fabricius, and *Cancer callianassa*, Herbst, are regarded as distinct species, but A. Milne Edwards (*Archiv. Mus. Hist. Nat.*, vol. x. p. 382, 1861), unites the form figured by de Haan as *variegatus* with *Goniosoma callianassa*, although he uses the last-mentioned name for the species.

[2] I retain Fabricius' designation *cruciferum* for this species, although Herbst's name, *cruciatus*, has distinct priority, because the former is not only the one that has been used by all systematists, but also is clearly indicative of the remarkable coloration, in reference to which the term *cruciatus* is inapplicable.

These specimens differ from what I will regard as the typical condition of the species (represented in de Haan's figures of the adult) in the more slender chelipedes, which are less distinctly granulated and bear longer spines. I may add, that the posterior tooth of the antero-lateral margin is more distinctly spiniform; the orbital margins are granulated, as is the basal joint of the antennæ. The larger of the two females in the Challenger collection measures as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	13	27·5
Breadth of carapace,	17½	37

Thalamonyx, A. Milne Edwards.

Thalamonyx, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 168, 1873.

This genus was established by A. Milne Edwards for two small forms, which I think are not specifically distinct, and which are perhaps best placed between *Goniosoma* and *Thalamita*, but also present evident affinities with *Portunus*, *Bathynectes*, and *Lissocarcinus*. The description given above of *Goniosoma* will apply, in nearly all particulars, to *Thalamonyx*, but the carapace is narrower, and the antero-lateral margins less oblique than in many species of that genus. The front is only four-lobed, as in many species of *Thalamita;* the median lobes prominent, much wider than the lateral lobes, and divided by a small median notch or fissure. As in *Goniosoma* the basal antennal joint is produced at its antero-external angle into a process which occupies the interior hiatus of the orbit, but does not widely exclude the flagellum from it, as in *Thalamita*. The chelipedes are subequal and rather small. The merus-joint of the fifth (natatory) legs has a spine on its inferior margin, near the distal extremity; the penultimate and terminal are dilated, as in *Goniosoma* and *Thalamita*.

Thalamonyx danæ, var. *gracilipes*, A. Milne Edwards.

Charybdis (?), Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 287, pl. xvii. fig. 13, 1852.
Goniosoma danæ, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. v. p. 153, pl. vii. figs. 6, 7, 1869.
Thalamonyx danæ, A. Milne Edwards, *op. cit.*, vol. ix. p. 170, 1873.
Thalamita gracilipes, A. Milne Edwards, *tom. cit.*, vol. ix. p. 169, pl. iv. fig. 3, 1873, var.

Tongatabu, 18 fathoms (Station 172); a small male and two females were collected.

♀.	Lines.	Millims.
Length of carapace, about	3½	7·5
Breadth of carapace, about	4½	9·5

The male measures as follows :—

♂.	Lines.	Millims.
Length of carapace, about	2½	5·5
Breadth of carapace, about	3	6·5

Neither of the females bears ova. These specimens should perhaps be designated as a distinct variety from either *Thalamita danæ* or *Thalamita gracilipes*, A. Milne Edwards, since the carapace is not only very distinctly granulated but also pubescent. The chelipedes are slender, and the palms are granulated as in the latter form.

Subfamily 2. THALAMITINÆ.

Thalamita, Latreille.

Thalamita, Latreille, Crust. in Règne Animal de Cuvier, ed. 2, vol. iv. p. 33, 1829, footnote.
„ A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 354, 1861.
Thalamites quadrilatères, Milne Edwards, Hist. Nat. Crust., vol. i. p. 459, 1834.

Carapace widely transverse and depressed, with the raised lines of the dorsal surface usually very distinctly defined, those which originate from the base of the lateral epibranchial spine often extending in a nearly continuous line from side to side; anteriorly the carapace is truncated; the front is divided into four, six, or eight lobes or teeth; the antero-lateral margins are short, and set at nearly a right angle with the front, and are nearly always divided into four or five teeth, one of which may be rudimentary. The orbits are not large, and are marked with two fissures in the upper margin, and with a notch or fissure in the lower margin; the interior subocular angle is usually rounded and not prominent. The post-abdomen (as usual in the Portunidæ) is five-jointed; the third to the fifth segments consolidated into a single piece. The eyes are set on very short, thick pedicels. The basal joint of the antennæ is very greatly developed and widely transverse, is united with the front along nearly the whole of its interior (or anterior) margin, and entirely fills the interior orbital hiatus, from which the flagellum is usually separated by the whole width of the lateral frontal tooth. The ischium of the endognath of the exterior maxillipedes is not produced at its antero-internal angle; the merus is distally truncated, obliquely truncated or very slightly emarginated at its antero-internal angle, and with the antero-external angle rounded or subacute and but little produced. The chelipedes in the adult male are subequal and moderately developed, and are armed with spines; and (as in so many other Portunidæ) the carpus and palm are usually longitudinally costated on their exterior surface; the dactyli (as in *Neptunus*) are nearly straight, with the tips incurved, and are armed with unequal rounded teeth on their interior margins. The ambulatory legs present nothing remarkable; the fifth (natatory) legs have, as usual, the penultimate and terminal joints considerably dilated.

The species never attain a very large size, and occur very commonly throughout the Indo-Pacific region, and also less frequently on the eastern shores of the Atlantic, and only, I believe, in shallow water (to 20 fathoms). Many are separated by characters of slight importance, and Dr. R. Kossmann,[1] goes so far as to unite, under the single designation *Thalamita prymna*, all the species with eight-lobed front (*Thalamita prymna*, *Thalamita stimpsoni*, *Thalamita picta*, *Thalamita spinimana*, *Thalamita cæruleipes*, *Thalamita crenata*, *Thalamita danæ*), which are distinguished by A. Milne Edwards in his Monograph, several of which, in the present Report, are retained, provisionally at least, as distinct.

The following are species which have been described since the publication of A. Milne Edwards' Report on the Portunidæ :—

Thalamita speciosa, Miers. Samoan Islands.

Thalamita hellerii, Hoffmann. Madagascar; Nossy Faly Island. (Perhaps a variety of *Thalamita crenata*.)

Thalamita integra, var. *africana*, Miers. Canary Islands; Goree Island, Senegambia, 9 to 15 fathoms.

Thalamita quadrilobata, Miers. Seychelles, 4 to 12 fathoms.

Thalamita intermedia, n. sp. Torres Strait.

Thalamita sexlobata, n. sp. Tongatabu, off Nukalofa, 18 fathoms.

§. *Thalamitæ with Four-lobed front.*

Thalamita admete (Herbst).

Cancer admete, Herbst, Naturgesch. der Krabben u. Krebse, iii. Heft. iii., p. 40, pl. lvii. fig. 1, 1803.

Thalamita admete, Latreille, Crust. in Règne Animal de Cuvier, ed. 2, vol. iv. p. 33, 1829.

" " Milne Edwards, Hist. Nat. Crust., vol. i. p. 439, 1834; Règne Animal de Cuvier, ed. 3, Crust. Atlas, pl. ix. fig. 2 (?).

" " A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 350, 1861.

Levuka, Fiji Islands (on the reefs), a small female.

In this specimen the chelipedes are slender; the fourth antero-lateral tooth, although smaller than the rest, is yet well developed. The ambulatory legs are prettily banded with fuscous brown.

Two males obtained at Tongatabu, on the reefs, approach the variety designated *Thalamita savignyi* by A. Milne Edwards, in having the palms of the chelipedes granulated between the spines of the upper surface.

Adult ♂.	Lines.	Millims.
Length of carapace (of the largest specimen), ...	8½	18
Breadth of carapace, ...	14½	31

[1] Malacostraca in Zool. Ergebn. einer Reise Küstengeb. d. rothen Meeres, p. 47, 1877.

Thalamita integra, Dana.

Thalamita integra, Dana, Proc. Acad. Nat. Sci. Philad., p. 85, 1852; U.S. Explor. Exped., vol. xiii., Crust. 1, p. 281, pl. xvii. fig. 6, 1852.
„ „ A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 358, 1861.

Honolulu. Several specimens, males, were taken on the reefs, and one purchased in the market.

Adult ♂.	Lines.	Millims.
Length of carapace,	14½	30·5
Breadth of carapace, about	22	47

The smoothness of the basal antennal joint and of the exterior surface of the palms of the chelipedes are sufficient, apparently, to distinguish adult examples of this form from its near ally, *Thalamita admete*.[1]

Thalamita sima, Milne Edwards.

Thalamita sima, Milne Edwards, Hist. Nat. Crust., vol. i. p. 460, 1834.
„ „ A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 359, 1861.
„ „ Miers, Crust. in Zool. Coll. H.M.S. "Alert," p. 231, 1884.
Portunus (*Thalamita*) *arcuatus*, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 10, 1833, *sine descriptione*, and p. 43, pl. ii. fig. 2, and pl. xiii. fig. 1, 1835.

South Australian Coast, 2 to 10 fathoms, April 1874 (an ova-bearing female); Torres Strait, lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E., in 8 fathoms, Station 186 (another female bearing ova). This latter, which is the largest example, measures as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace,	7½	15·5
Breadth of carapace, nearly	11	23

§§ *Thalamitæ with Six-lobed front.*

I place in this new section of the genus two species which are of much interest as being intermediate between the typical *Thalamitæ* and the genus or subgenus *Thalamitoides*, A. Milne Edwards.[2]

They agree with the latter in their six-lobed front, but are distinguished by the much lesser width of the carapace and less numerously spined palms of the chelipedes, points wherein they altogether resemble the other species of *Thalamita*. Should intermediate forms occur, it may be found more convenient to unite the species of this section to *Thalamitoides*.

[1] In some small specimens, however, and particularly in small examples of the variety designated *africana*, by myself, from Goree Island, Senegambia, traces of ridges and granulations appear on the exterior surface of the palms of the chelipedes.

[2] *Nouv. Archiv. Mus. Hist. Nat.*, vol. v. p. 146, 1869.

Thalamita intermedia, n. sp. (Pl. XVI. fig. 1).

The carapace is broadly transverse, and is covered with a close, whitish pubescence; the transverse ridges which cross its dorsal surface are not more distinct than in *Thalamita admete*, to which species and to *Thalamita savignyi*, *Thalamita intermedia* is nearly allied. Of the six lobes of the front the median are smallest, and separated by a narrow and rather deep incision; the submedian and lateral are subequal, the latter slightly overlapping the former; the lateral lobes project somewhat less than the others. The orbits have two distinct fissures in the upper and one in the lower margin. The five spines of the antero-lateral margin are all well developed, but the three anterior are very slightly larger than the fourth and fifth. The basal antennal joint is very distinctly granulated; the maxillipedes present nothing remarkable. The chelipedes in the male are subequal, the merus or arm with three spines on its anterior margin, of which the two nearest to the distal extremity are largest; wrist with a strong spine on its inner margin and three small spinules on its outer surface; palm with three or four spines, disposed alternately in two series, on its upper surface, and with three granulated ridges on its outer surface, between which are other granules, as in *Thalamita savignyi*; the fingers are somewhat shorter than the palm, and irregularly denticulated on their inner margins; the ambulatory legs slender and slightly compressed; the fifth legs, shaped much as in *Thalamita admete* and *Thalamita savignyi*, with a spine near the distal end of the inferior margin of the merus-joint, and with the inferior margin of the penultimate joint armed with a very distinct series of small spinules. Colour (in spirit) pinkish-brown; pubescence whitish.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	6	14
Breadth of carapace,	10	21
Length of a chelipede,	13	27·5
Length of first ambulatory leg,	12	25

The unique specimen (a male) was dredged in the Torres Strait, in 8 fathoms, lat. 10° 30′ 0″ S., long. 142° 18′ 0″ E. (Station 186).

Thalamita sexlobata, n. sp. (Pl. XVI. fig. 2).

The carapace is transverse and closely pubescent; the transverse ridges of its dorsal surface distinct but not prominent. The median lobes of the front are slightly rounded, smaller than the submedian lobes, and are separated by a small and shallow notch, the submedian are broader than either the median or lateral lobes, and slightly overlap the former, from which they are separated by a scarcely appreciable notch; the lateral lobes are separated from the submedian lobes by a rather wide interspace, and are not very prominent, their inner margin is continued as an oblique carina for a short distance behind the frontal margin. The upper margin of the orbit is marked with two fissures, and the lower margin with a small notch. The antero-lateral marginal teeth (the fourth

excepted) are subequal, the first a very little larger than the others; the fourth is represented by a mere rudiment; the postero-lateral angles of the carapace are rounded. The basal antennal joint is armed with a minutely granulated ridge. The chelipedes in the female are pubescent and rather slender; the merus-joint is armed with two spines (and a smaller denticle) on its anterior margin, and a strong triangular lobe or tooth at the distal end of its inferior (not posterior) margin; its posterior margin is rounded and entire; the wrist has a strong spine on its inner margin, and three small spinules on its outer surface; the palm has four spines, one basal near the articulation with the wrist, one distal at the base of the dactylus, one (longer) behind this on the inner and upper margin, and one on the upper surface; the fingers are somewhat longer than the palm, and are armed, as usual in the genus, with irregularly alternating teeth; the ambulatory legs are of moderate length (the third the longest), compressed and slightly pubescent; the merus of the fifth or swimming legs is armed on its inferior margin with a strong spine placed at some distance behind the distal extremity; the penultimate joint, as already stated, is unarmed; the terminal joint is ciliated, ovate, and mucronate at its distal extremity.

Adult ♀.	Lines.	Millims.
Length of carapace, about	4½	9·5
Breadth of carapace,	6½	13·5
Length of a chelipede,	8½	18
Length of third ambulatory leg, about	8	17·5

Off Nukalofa, Tongatabu, 18 fathoms (Station 172). An adult and a smaller female.[1]

This species is very nearly allied to the foregoing, which it resembles in its six-lobed front, and in the form of the carapace, but it is distinguished by the following characters: the carapace is narrower; the frontal lobes, as a reference to the figure will show, are of different shape; the fourth antero-lateral spine is rudimentary; the basal antennal joint is nearly smooth, and the inferior margin of the penultimate joint of the fifth ambulatory legs is not denticulated or spinuliferous as in *Thalamita intermedia*.

§§§ *Thalamitæ with Eight-lobed front.*

Thalamita prymna.

? *Cancer prymna*, Herbst, Naturgesch. der Krabben u. Krebse, iii. Heft. iii. p. 41, pl. lvii. fig. 2, 1803.

? *Portunus* (*Thalamita*) *prymna* (var. β.), de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 10, 43. pl. xii. fig. 2, 1833.

Thalamita prymna, Milne-Edwards, Hist. Nat. Crust., vol. i. p. 461, 1834.

" " A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 360, 1861, et synonyma.

Tongatabu (on the reefs), an adult female; Ternate, 15th October, 1874, an adult male.

[1] The figure is restored from the two specimens, neither being perfect.

In the specimen from Ternate, the third of the frontal teeth is less distinctly truncated, narrower and more rounded at its extremity than in other adult examples I have examined.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	18	37·5
Breadth of carapace,	24½	52

A female from the Philippine Islands (Samboangan) is in the collection, which is in some degree intermediate between this species and the newly-allied and perhaps not distinct *Thalamita stimpsoni*, A. Milne Edwards. In this specimen the frontal lobes altogether resemble those of *Thalamita prymna*, but the basal antennal joint bears a line of strong granules in place of the well-developed spines of that species. The fourth antero-lateral marginal tooth is reduced to a mere insignificant rudiment, not discernible except by close examination with a lens.

♀.	Lines.	Millims.
Length of carapace,	12	25
Breadth of carapace,	18	38

Thalamita stimpsoni, A. Milne Edwards.

Thalamita stimpsoni, A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 362, pl. xxxv. fig. 4, 1861.

Samboangan, 10 fathoms (from the reefs). A small female, bearing ova.

The fourth antero-lateral marginal tooth in this specimen is on one side wholly absent, and on the other represented by a mere insignificant rudiment. In all other characters, and particularly in the characteristic form and disposition of the frontal lobes, this specimen agrees with the description and figure cited.

Adult ♀.	Lines.	Millims.
Length of carapace,	5½	11·5
Breadth of carapace,	8½	18

Two small and immature females are in the collection from Nukalofa, Tongatabu, 18 fathoms (Station 172), which are perhaps young of this species. They differ, however, in the form of the frontal lobes; the lobes are smaller and less prominent, and the next on each side narrower, rounded, and very distinctly separated from the submedian lobes by a deep fissure. The larger has the following dimensions:—

♀.	Lines.	Millims.
Length of carapace,	3	6·5
Breadth of carapace,	4½	9·5

Thalamita crenata, Rüppell.

Thalamita crenata, Rüppell, Beschreib. u. Abbild. 24 kurzschwänzigen Krabben d. rothen Meeres, p. 6, pl. i. fig. 2, 1830.
" " Milne Edwards, Hist. Nat. Crust., vol. i. p. 461, 1834.
" " A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 365, 1861, and references to literature.

Albany Island, Cape York (an adult ova-bearing female).

Adult ♀.	Lines.	Millims.
Length of carapace, about	18½	39
Breadth of carapace, about	25½	53·5

This form, when fully grown, is one of the largest of the group. *Thalamita danæ*, Stimpson, and *Thalamita cæruleipes*, Jacquinot and Lucas, are perhaps mere varieties of this species.

Subfamily 3. CARCININÆ.

Portunus, Fabricius.

Portunus, Fabricius (pt.), Entom. Syst. Suppl. (?), p. 363, 1798.
" Milne Edwards (pt.), Hist. Nat. Crust., vol. i. p. 439, 1834.
" A. Milne Edwards (pt.), Archiv. Mus. Hist. Nat., vol. x. p. 392, 1861.
Liocarcinus (subgenus), Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 146, 1870, footnote.

Carapace moderately transverse, depressed, with the lateral margins arcuated, and armed with five regular and even teeth; the front of moderate width, and divided into several lobes or teeth, which are not very prominent; and the last tooth scarcely, if at all, exceeds the preceding one in length; the orbits are not large, and possess two fissures in the superior, and one or two in the inferior margin. The ridges of the endostome or palate are not always developed. The post-abdomen is five-jointed (the third to the fifth segments consolidated). The eyes are set on very short, thick pedicels. The basal joint of the antenna is short and but little dilated, it is generally united with the frontal margin, but does not always completely fill the interior hiatus of the orbit. The ischium of the exterior maxillipedes is not produced at its antero-internal angle, the merus is distally truncated or very slightly rounded, with the antero-internal angle scarcely, if at all, emarginate, and the antero-external angle not produced. The chelipedes are subequal and moderately developed; the arm or merus is smooth, without spines, carpus or wrist with a strong spine on its inner margin, palm with a spine near to the distal extremity of the superior margin, and usually somewhat indistinctly costated on the exterior surface. Ambulatory legs of moderate length, with the dactyli styliform; fifth or natatory legs with the penultimate and terminal joints dilated and compressed, the terminal joint ovate, as in other Portunidæ.

Of the species enumerated by A. Milne Edwards, one, *Portunus longipes*, Risso (= *Portunus dalyelli*, Spence Bate), has since been referred to *Bathynectes*. The species designated by Kinahan, *Portunus carcinoides*, is perhaps identical with *Portunus corrugatus*.

The species of this genus occur commonly in the European and North Atlantic Seas, in water of moderate depth, to 40 fathoms, or rarely at much greater depth (*e.g.*, *Portunus pusillus*, whose occurrence in the Mediterranean dredgings of the "Travailleur" at a depth of 450 mètres is recorded by A. Milne Edwards); one species, *Portunus guadulpensis*, occurs in the West Indian Seas.

Portunus corrugatus, the only species collected by the naturalists of H.M.S. Challenger, is also the form with the widest geographical range; it occurs, as noted below, not only in the European Seas and at the Azores and Cape Verde Islands, but also in the South Australian Seas and at Japan.

Portunus corrugatus (Pennant).

Cancer corrugatus, Pennant, Brit. Zool., vol. iv. p. 5, pl. v. fig. 9, 1777.
Portunus corrugatus, Leach, Edin. Encycl. Lond., vol. vii. p. 390, 1814; Trans. Linn. Soc. Lond., vol. xi. p. 315, 1815; Malacostraca Podophthalmata Britanniæ, pl. vii. figs. 1, 2, 1815.
" " Milne Edwards, Hist. Nat. Crust., vol. i. p. 443, 1834.
" " de Haan, Crust. in v. Siebold, Fauna Japonica, p. 40, 1835.
" " Bell, Brit. Stalk-eyed Crust., p. 94, 1853.
" " A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 401, pl. xxxvi. fig. 3, 1861.
" " Heller, Crust. des südlichen Europa, p. 86, 1863.
" " Miers, Proc. Zool. Soc. Lond., p. 33, 1879.
" *carcinoides*, Kinahan, Dubl. N. H. Rev. Proc. of Soc., vol. iv. p. 66, pl. ix. fig. 3, 1857.
" *strigilis*, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 38, 1858.
" " A. Milne Edwards, *tom cit.*, p. 402, 1861.
" *subcorrugatus*, A. Milne Edwards, Archiv. Mus. Hist. Nat., *tom. cit.*, p. 402, pl. xxxvi. fig. 2, 1861, var.

Off Fayal, Azores, 50 to 90 fathoms (Station 75?), a small female; Cape Verde Islands, St. Vincent, July 1873 (an immature female); Australia, Victoria, Port Philip, 33 fathoms, Station 161 (an adult male and three small specimens); Bass Strait, off East Moncœur Island, 38 fathoms, Station 162 (an adult male and three small specimens), April 1874.

The largest Australian male measures as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace, ...	6½	13·5
Breadth of carapace, nearly	8	16·5

Portunus corrugatus is now for the first time, I believe, recorded from the southern hemisphere; its occurrence in the Japanese Seas was noted by de Haan so long ago as 1835, and again by Dr. Stimpson in 1858 (as *Portunus strigilis*), and by myself in 1876. The form designated by A. Milne Edwards *Portunus subcorrugatus*, from the Red Sea, is probably, as I have already noted, a variety of *Portunus corrugatus*.

Platyonychus, Latreille.

Platyonychus, Latreille (pt.), Nouv. Dict. d. Hist. Nat., vol. xxvii. p. 4, 1818.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 435, 1834.
„ A. Milne Edwards (pt.), Archiv. Mus. Hist. Nat., vol. x. p. 410, 1861.
Anisopus, de Haan (subgen.), Crust. in v. Siebold, Fauna Japonica, p. 12, 1833.

Carapace depressed and transverse; the dorsal surface without tubercles or transverse ridges; the front is rather narrow, and armed with three or four lobes or teeth; the antero-lateral margins arcuated, and armed with five teeth or spines, including the lobe at the exterior orbital angle and the lateral epibranchial tooth, which is no longer than the preceding tooth; the orbits are rather widely open above, and have one or two fissures in the superior, and one in the inferior margin. The ridges of the endostome are obsolete. The post-abdomen is usually distinctly seven-jointed, but in *Platyonychus ocellatus* it is five-jointed, with the third to the fifth segments consolidated. The eyes are of moderate length. The basal joint of the antennæ is short and not dilated, and occupies, but does not wholly fill, the interior hiatus of the orbit, and is not united at its distal extremity with the front. The exterior maxillipedes are rather large; their ischium joint is not produced at the antero-internal angle; the merus is obliquely truncated at the distal extremity, with the antero-external angle rounded and not at all produced. The chelipedes (in the adult males) are subequal and not greatly elongated, with the palms externally more or less distinctly longitudinally costated; the fingers elongated, and armed on the interior margins with large, triangular lobes, alternating with smaller teeth. The ambulatory legs are of moderate length, with the dactyli styliform and compressed; the fifth or natatory legs have, as usual, the penultimate and terminal joints compressed and dilated; the terminal joint not lanceolate as in *Portumnus*, but broadly ovate and rounded at the distal extremity.

I have elsewhere[1] proposed to restrict this genus to the forms with broader carapace and more broadly dilated and ovate dactyli of the fifth or natatory legs, and to separate, under Leach's designation *Portumnus*, the other species included by A. Milne Edwards in *Platyonychus*. Thus restricted, the genus *Platyonychus* will include the following species, the first two of which are, I believe, confined to shallow water:—

[1] Crust. in Zool. H.M.SS. "Erebus" and "Terror," p. 2, 1874.

Platyonychus ocellatus (Herbst). East Coast of United States; Gulf of Mexico, New Zealand (Dr. J. Hector).[1]

Platyonychus bipustulatus, Milne Edwards (=*Anisopus punctatus*, de Haan; *Portunus catharus*, White; *Platyonychus purpureus*, Dana). Indo-Malaysian, and Australian Seas; New Zealand; Chili; West Patagonia, Trinidad Channel.

Platyonychus iridescens, n. sp. Ki Islands, 140 fathoms (Station 192).

Platyonychus bipustulatus, Milne Edwards.

Platyonychus bipustulatus, Milne Edwards, Hist. Nat. Crust., vol. i. p. 437, pl. xvii. figs. 7–10, 1834.

" " A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 413, 1861, and references to synonyms.

Corystes (Anisopus) punctatus, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 13, 44, pl. ii. fig. 1, 1835.

Off the South Australian Coast, 2 to 10 fathoms, April 1874. Three small specimens (two males and a female).

Adult ♂.	Lines.	Millims.
Length of carapace,	9½	20
Breadth of carapace to base of lateral epibranchial tooth,	11	23·5

Platyonychus iridescens, n. sp. (Pl. XVII. fig. 2).

The carapace in this fine species is shaped nearly as in *Platyonychus ocellatus* and *Platyonychus bipustulatus;* it is moderately convex, broader than long, with the antero-lateral margins arcuated and shorter than the concave postero-lateral margins; its surface is rather coarsely granulated, except near the front, and in the posterior parts, near the posterior margin, the shallow depressions indicating the cervical suture are as distinct as in *Platyonychus ocellatus.* The front (as in that species) is armed with three spines (the lateral spines being those of the inner angle of the orbit), the median spine, although somewhat more prominent than the lateral spines, is not nearly so large as in *Platyonychus ocellatus.* The orbits have a notch in their upper margins, and a spine at the inner subocular angle. The antero-lateral margins are armed with five rather distant spiniform teeth; the first (or exterior orbital tooth) is rather prominent, the second and third smaller and rather more closely approximated than are the other antero-lateral teeth. The pterygostomian regions are granulated, and are marked (as in *Platyonychus ocellatus*) with an oblique granulated line extending to the antero-lateral angles of the buccal cavity. The segments of the post-abdomen are distinct, in the male the first and second segments are small, the third transversely carinated; the sixth segment is longest, with

[1] *Trans. New Zeal. Inst.*, vol. ix. p. 473, pl. xxviii. fig. 1, 1877.

the sides slightly arcuated, and it is strongly excavated at its distal extremity, where it receives the very small transverse terminal segment, which is distally rounded. The eyes are large and thick, and their corneæ occupy a large part of the inferior surface of the peduncle. The antennules are long, with the basal joints considerably enlarged, and they terminate in two short flagella. The short oblong basal joints of the antennæ occupy the whole of the space between the inner subocular spine and the basal joints of the antennules; the second and third joints are slender and short, the flagella (in the male) rather long, composed of upwards of thirty joints. The outer maxillipedes have the ischium (as in *Platyonychus ocellatus*) longitudinally canaliculated; the merus is longer than broad, obliquely truncated at its distal extremity, with the antero-external angle rounded, the antero-internal angle not (as in *Platyonychus ocellatus*) greatly produced, but terminating in a small rounded lobe as in *Platyonychus bipustulatus*. The chelipedes (in the adult) are robust and elongated; the merus-joint is armed with three to five spinules on the distal half of its anterior margin; the carpus is granulated above, and is armed with three spines (one on its inner surface, one on its outer, and one, distal, above the articulation with the wrist); the palm is about as long as the merus, longitudinally concave, and very coarsely granulated, on its upper surface more finely granulated, with two longitudinal ridges on the outer surface, and with four or five spinules on the distal half of its upper and inner margin; the fingers are longer than the palm; the dactyl has five or six strong spines on its upper margin, both fingers are incurved at the tips, and strongly dentated on their inner margins, the teeth disposed nearly as in *Platyonychus bipustulatus*. The second to fourth legs are compressed, nearly smooth, with the dactyli slenderer and more elongated than in *Platyonychus ocellatus* and *Platyonychus bipustulatus*; the fifth legs are nearly as in *Platyonychus ocellatus*, with the antepenultimate joint carinated above, the penultimate and terminal joints greatly compressed, the terminal joint large and ovate. Colour (in spirit) yellowish-brown; the legs, and especially the chelipedes, are strongly and beautifully iridescent (hence the specific name).

The largest male and female have the following dimensions:—

Adult ♀.	Lines.	Millims.
Length of carapace and rostrum,	23	48·5
Breadth of carapace,	28	59·5
Length of a chelipede, nearly	43	91
Length of first ambulatory leg,	36	76·5
Length of fifth ambulatory leg,	29¾	61
Adult ♂.		
Length of carapace and rostrum, about	18	38·5
Breadth of carapace,	21½	45
Length of a chelipede, about	35	74
Length of first ambulatory leg,	30	63·5
Length of fifth ambulatory leg,	27	56·5

An adult and two immature males, and two adult females, were dredged near the Ki Islands, in 140 fathoms, lat. 5° 49′ 15″ S., long. 132° 14′ 15″ E. (Station 192).

In the adult female the post-abdomen is rather narrow, broadest at the sixth joint. In the small males the carapace is more convex and uneven, the eyes very large, the marginal spines of the carapace are relatively longer, and the penultimate and terminal joints of the fifth legs are fringed with longer hairs. One of these has the following dimensions :—

Young ♂.	Lines.	Millims.
Length of carapace and rostrum,	6½	13·5
Breadth of carapace,	7½	15·5
Length of a chelipede,	11	23·5
Length of fifth leg,	8½	18

This very remarkable *Platyonychus* is allied to the East American *Platyonychus ocellatus* in the form of the frontal spines, and to the Oriental *Platyonychus bipustulatus* in the structure of the merus of the outer maxillipedes, but differs from both in the strongly-granulated and spinuliferous palm and dactyl of the chelipedes, the more slender dactyli of the ambulatory legs, the iridescent reflections of the limbs, &c.

Lissocarcinus, Adams and White.

Lissocarcinus, Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 45, 1848.
„ A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 417, 1861.

Carapace depressed, smooth, transverse, little, if at all, broader than long, with the frontal margins and the antero-lateral margins of the carapace thin, acute, the lateral margins either subentire or divided into five lobes or teeth. The front projects somewhat beyond the level of the orbits, and is either subentire or divided by a median notch into two lobes, which may be separated on each side by a slight incision from the interior angle of the orbit. The ridges of the endostome are usually developed, but indistinct. The post-abdomen of the male in *Lissocarcinus orbicularis*[1] is five-jointed, with the third to the fifth segments coalescent. The eyes are very short. The basal antennal joint is dilated, but not transverse, occupies the interior hiatus of the orbit, and is slightly produced at its antero-external angle. The ischium of the endognath of the exterior maxillipedes is not produced at its antero-internal angle, the merus is longer than broad, obliquely truncated along the interior margin, and is not greatly produced at its antero-external angle. The chelipedes are short, subequal; merus trigonous, carpus with a spine on its interior margin, palm short, either smooth or costated externally, fingers strongly dentated on the inner margins, the dactylus sometimes carinated above. Ambulatory legs very short, with the dactyli styliform; fifth or

[1] This is the only species of which I have examined males.

natatory legs with the penultimate and terminal joints moderately dilated, the terminal joints either ovate or ovate lanceolate.

This genus is evidently very nearly allied to *Carupa*, Dana, and transitional forms may hereafter occur, which may render it desirable to unite *Carupa* with *Lissocarcinus*. *Carupa* has, however, a less prominent front, and a narrower basal antennal joint.

Of the species already described, one, *Lissocarcinus boholensis*, Nauck, is found at Bohol, one, *Lissocarcinus polybioides*, occurs in the Indo-Malaysian and Australian Seas, the other, *Lissocarcinus orbicularis*, Dana, throughout the Indo-Pacific region.

In the collection of H.M.S. Challenger is an apparently undescribed form from the Celebes Sea (10 to 20 fathoms) which I will designate *Lissocarcinus lævis*.

Lissocarcinus polybioides, Adams and White.

Lissocarcinus polybioides, Adams and White, Crust., in Zool. H.M.S. "Samarang," p. 46, pl. xi. fig. 5, 1848.
" " A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 417, 1861.

South Australian Coast, 2 to 10 fathoms, April 1874. An adult ova-bearing female.

Adult ♀.	Lines.	Millims.
Length of carapace and front, nearly	6	12
Breadth of carapace,	6	12

Lissocarcinus lævis, n. sp. (Pl. XVII. fig. 3).

The carapace is broader than long, in its median portion moderately convex, and to the naked eye it appears smooth and shining, but under the microscope punctulated and minutely granulated. The front is four-lobed; the median lobes scarcely more prominent than the lateral ones, broad and truncated, separated by a small median notch, the lateral lobes (or inner orbital angles) small and dentiform. Orbits entire. Antero-lateral margins shorter than the postero-lateral margins and armed with five teeth, whereof the first is very small and little prominent, the second, third, and fourth subequal and not acute, the fifth small and dentiform; the postero-lateral margins are strongly concave; the eye-peduncles are very short. The antennulary fossettes are transverse. The basal joint of the antennæ is much enlarged, longer than broad; its inner and distal angle fills the inner orbital hiatus, and is produced into a strong tooth or lobe, which projects considerably beyond the inner subocular lobe; the two following joints are small and subequal; the ischium of the outer maxillipedes is longitudinally canaliculated on its outer surface, the merus is narrower at its distal extremity (which is truncated) than at the base. The chelipedes (in the female) are subequal; merus without teeth or spines, but with a small tubercle on its anterior margin near the distal extremity; carpus smooth, but

with a strong spine on its inner margin; palm smooth and rounded on its outer and upper surfaces, without either teeth, spines, or carinæ; fingers as long as the palm, acute, and regularly toothed on their inner margins. The three following legs are smooth and very slender, with straight styliform dactyli; the posterior or swimming legs moderately robust; merus without spines, but obscurely dentated at the distal inferior angle; penultimate joint thin and compressed, terminal joint ovate, the margins almost destitute of cilia. Colour (in spirit) yellowish-brown, carapace rather obscurely marked with irregular purplish spots and blotches, as in *Lissocarcinus orbicularis*.

Adult ♀.	Lines.	Millims.
Length of carapace,	5½	11·5
Breadth of carapace,	6½	13·5
Length of a chelipede, about	7½	16
Length of first ambulatory leg,	7	15

The single specimen (an adult ova-bearing female) was dredged in the Celebes Sea, south of Mindanao, in lat. 6° 54′ 0″ N., long. 122° 18′ 0″ E., in 10 fathoms (Station 212). The nearest ally to this species in the genus is *Lissocarcinus polybioides*, Adams and White, from which *Lissocarcinus lævis* is distinguished not only by the less prominent, more distinctly truncated front, but also by the different form of the antero-lateral marginal teeth.

Lissocarcinus lævis in some particulars is intermediate between the genera *Lissocarcinus* and *Thalamonyx*. The Challenger species has a broader, less prominent front than the other species of *Lissocarcinus*, and herein resembles *Thalamonyx*, from which it is distinguished by the absence of distinct spines from the palms of the chelipedes and from the inferior margin of the merus-joint of the fifth (natatory) legs.

Lissocarcinus boholensis of Semper (*ined.*) and Nauck, from Bohol, in the Philippines, is (although very briefly characterised), distinguishable from *Lissocarcinus lævis* by the more rounded frontal teeth and the rougher chelipedes.

Section II. **Podophthalminæ.**

Portuniens anormaux, A. Milne Edwards, Ann. d. Sci. Nat., ser. 4, vol. xiv. p. 283, 1860; Archiv. Mus. Hist. Nat., vol. x. pp. 611, 419, 1861.

Carapace transverse and widest anteriorly, with the front very narrow, spatuliform and inflexed. Orbits extremely large. Eye-peduncles very greatly elongated, occupying nearly the whole width of the carapace in front.

This section includes only the genera *Podophthalmus*, Lamarck, and *Euphylax*, Stimpson.[1]

[1] According to Dr. E. Nauck (Das Kaugerüst der Brachyuren, *Zeitschr. f. wiss. Zool.*, vol. xxxiv.), the genus *Hedrophthalmus*, Nauck, is allied to *Podophthalmus*, but it will not enter into the Podophthalminæ as above characterised.

Podophthalmus, Lamarck.

Podophthalmus, Lamarck, Syst. Anim. sans Vert., vol. v. p. 152, 1801.
„ Milne Edwards, Hist. Nat. Crust., vol. i. p. 465, 1834.
„ A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 419, 1861.

In this long known but remarkable genus the carapace is depressed and very broadly transverse, anteriorly truncated, and widest in front; the exterior angles of the orbits terminate in a strong spine, and posterior to this, upon the lateral margins (in *Podophthalmus vigil*), is another spine; the lateral margins converge very rapidly to the posterior margin. The front or space included between the bases of the eye-peduncles is linear (as in some species of *Gelasimus*), but below the eyes it is transversely dilated and prolonged for a short distance beneath the bases of the eye-peduncles. The orbits are enormously developed, and extend along the whole of the anterior margin of the carapace. But very obscure traces (if any) exist of the longitudinal ridges of the endostome. The post-abdomen (in the male) is five-jointed, with the third to the fifth segments consolidated. The eye-peduncles are very slender and extremely elongated. The antennules are placed beneath the bases of the eye-peduncles, in large quadrate fossettes, into which the considerably elongated flagella cannot be retracted. The basal joint of the peduncle of the antennæ is short and moderately dilated, it occupies the interior hiatus of the orbit, and reaches the lateral process of the front. The ischium of the exterior maxillipedes is not produced at its antero-internal angle; the merus-joint is obliquely truncated at the distal extremity, and its antero-external angle is somewhat produced and broadly rounded. The chelipedes (in the adult male) are subequal and very large; their merus and carpus-joints are armed with spines, the palms are considerably elongated and longitudinally carinated on the exterior surface; fingers nearly straight and unequally dentated, as in other genera of Portunidæ. The ambulatory legs present nothing abnormal; the merus-joint of the fifth natatory legs is somewhat compressed, and has a spine on its inferior margin near the distal extremity; the penultimate and terminal joints are dilated, as in other Portunidæ. The single recent species of this genus (*Podophthalmus vigil*) is distributed throughout the whole Indo-Pacific region.

Podophthalmus vigil (Fabricius).

Portunus vigil, Fabricius, Entom. Syst. Suppl., p. 363, 1798.
Podophthalmus vigil, Leach, Zool. Miscell., vol. ii. p. 149, pl. cxviii., 1815.
„ „ Milne Edwards, Hist. Nat. Crust., vol. i. p. 467, 1834, et synonyma; Crust. in Règne Animal de Cuvier, atlas, pl. ix. fig. 1.
„ „ A. Milne Edwards, Archiv. Mus. Hist. Nat., vol. x. p. 420, 1861.

Honolulu, on the reefs (a fine adult male).

The principal dimensions of this specimen are as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace,	22½	47
Breadth of carapace to base of antero-lateral marginal spines,	43	91

Legion II. CYCLINEA.

Cyclinea, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 294, 1852.

This section was established by Dana for the single genus *Acanthocyclus*, which is intermediate in structure and position between the typical Cancroidea, the Plagusiinæ, and, as pointed out by Dr. Strahl,[1] the genera *Bellia* and *Corystoides*, which in Dana's system constitute a distinct subtribe, Bellidea, of the Crustacea Anomura. The nearest ally to *Acanthocyclus* is, I think, *Bellia*, which resembles *Acanthocyclus* in the more or less orbiculate carapace, in the form of the front, chelipedes, and ambulatory legs, but is distinguished by the narrower, more elongated merus of the exterior maxillipedes, by the broader post-abdomen of the male, and the less distinctly defined buccal cavity. Perhaps, nevertheless, as in Dr. Strahl's arrangement, this genus should be placed in the same section of the Brachyura as *Acanthocyclus*.

The Cancroid genus *Cymo*, and the genus *Crossotonotus*, which is placed by A. Milne Edwards in the Catometopa (which have a more or less orbiculate carapace) are distinguished from *Acanthocyclus* by the form of the front, the well-developed flagellum of the antennæ, &c.

Acanthocyclus, Milne Edwards and Lucas.

Acanthocyclus, Milne Edwards and Lucas, Crust. in d'Orbigny, Voy. dans l'Amérique Méridionale, Zool., vol. vi. p. 29, 1843.
Plagusetis, Heller, Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, vol. xii. p. 522, 1862.

In this genus the carapace is subcircular, moderately convex, with the cervical and cardiac-branchial sutures distinct, the lateral margins are arcuated, or, in adult examples of large size, the carapace is somewhat quadrate, with the angles rounded. The antero-lateral margins are dentated. The front is rather narrow, with a prominent median lobe, which projects considerably beyond the interior angles of the orbits, which are small and without fissures. The post-abdomen (in the male) is narrow and five-jointed, with the third to the fifth segments consolidated. The epistoma is very small. No longitudinal ridges are developed upon the endostome. The eye-peduncles are short. The antennulary fossæ are very small, and receive no more than the bases of the antennules. The basal antennal joint is short, moderately dilated, and fills the interior orbital hiatus;

[1] *Monatsber. d. k. preuss. Akad. d. Wiss. Berlin*, p. 714, fig., 1861.

the flagellum is obsolete. The ischium-joint of the endognath of the exterior maxillipedes is much longer than the merus, and very slightly produced at its antero-internal angle, the merus is small, distally truncated, very slightly emarginated or obliquely truncated at the antero-internal angle, and the antero-external angle is not produced. The chelipedes (in the adult males at least) are unequal and well developed, or rather large, the joints are smooth, without spines; palm of moderate length, rounded above; fingers rather shorter than the palm, with the teeth of the inner margins small or sometimes indistinctly developed; in the larger chelipede the dactyl is arcuated, and the fingers have between them a wide intermarginal hiatus. Ambulatory legs of moderate length, with the joints smooth without spines; dactyli terminating in a strong arcuate claw.

The type species of this genus, *Acanthocyclus gayi* (=*Acanthocyclus villosus*, Strahl; *Plagusetes elatus*, Heller) occurs commonly on the shores of Chili and Patagonia, and in the Magellan Straits.

Acanthocyclus gayi, Milne Edwards and Lucas.

Acanthocyclus gayi, Milne Edwards and Lucas, Crust. in d'Orbigny, Voy. dans l'Amérique Méridionale, vol. vi. p. 30, pl. xv. fig. 1, 1843.
„ „ Miers, Proc. Zool. Soc. Lond., p. 69, 1881, and references to literature.

A male and also an adult female of extraordinary size were taken at Valparaiso on the beach, and a small male in Messier Channel, Patagonia, in January 1876 (in fresh water).

The dimensions of the adult female are as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	14½	30·5
Breadth of carapace,	15½	33
Length of larger chelipede when extended as far as its conformation will allow,	21½	45·5

Legion (?) III. CORYSTOIDEA.

Corystiens, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 139, 1837.
Corystoidea, Dana (subtribe), U.S. Explor. Exped., vol. xiii., Crust., p. 297, 1852.

The Corystoidea, which are placed by Milne Edwards between the Leucosiidæ and Dorippidæ at the end of the Brachyura, in the classification proposed by Dana constitute a distinct subtribe between the Cyclometopa and Catometopa, and are regarded by Dr. Claus[1] as a distinct family of the Cyclometopa, and placed by him between the Portunidæ and Thelphusidæ. This is perhaps their most natural position, As limited

[1] Grundzüge der Zoologie, p. 636, 1880.

by Dana, they constitute a somewhat heterogeneous and not very well-defined group, generally distinguished by the extension of the exterior maxillipedes over the anterior margin of the buccal cavity, and the elongated flagella of the exterior antennæ, and include forms related to widely separated families, as, for instance, *Trichocarcinus*, Miers = (*Trichocera*, de Haan), which is scarcely distinguishable from the genus *Cancer*.

The Challenger collection includes but two genera of this group; the first, *Hypopeltarium* (= *Peltarion*, Auctorum), on account of its orbiculate carapace, may be regarded as establishing the transition from the Corystoidea to the Cyclinea; the other, *Gomeza*, in the elongated carapace and the greatly developed flagella of the antennæ, is altogether a typical representative of the Corystoidea.

Hypopeltarium, n. gen.

Peltarion, Jacquinot and Lucas, Crust. in Voy. au Pole Sud. Zool., vol. iii. p. 80, 1853; name preoccupied.

Carapace nearly orbiculate, about as broad as long, moderately convex, with the dorsal surface uneven; the lateral margins and the margins of the orbits armed with spinules. The front is narrow, about one-sixth the greatest width of the carapace, and three-spined, the median spine sometimes notched at the distal extremity. There are two slight incisions in the superior margins of the orbits, and a much deeper and wider hiatus in the inferior margin, near the exterior orbital angle. The epistoma is but slightly transverse. The anterior margin of the buccal cavity is not distinctly defined; the ridges of the endostome are partially developed. The post-abdomen in the male is narrow and five-jointed, with the third to the fifth segments consolidated. The eye-peduncles are rather slender and of moderate length. The antennules are longitudinally plicated. The antennæ occupy the interior hiatus of the orbits; their basal joints are short, but slightly enlarged, scarcely any wider than the following joint, which is longer than the basal joint and slightly compressed; the antennal flagella, as in other Corystidæ, are elongated, but not half as long as the carapace. The maxillipedes are normal; the ischium is not produced at its antero-internal angle, the merus is subtruncated and spinuliferous at the distal extremity, and rounded at the antero-external angle; the antero-internal angle is not emarginated. The chelipedes (in the adult male) are well developed, but not very large; merus trigonous without spines; carpus with a strong spine at its antero-internal angle; palm compressed, short, spinuliferous above; fingers robust, scarcely as long as the palm, and rather obscurely dentated on the inner margins, distally acute; the dactylus spinuliferous on the superior margin. The ambulatory legs are moderately elongated, with the joints, except the dactyli, more or less granulated or spinuliferous; dactyli styliform, slender, and much longer than the penultimate joints.

The single species of this genus (*Hypopeltarium spinosulum*) is common in the

Straits of Magellan, at the Falklands, and on the coasts of Chili and Patagonia, in shallow water (to 45 fathoms).

It is nearly allied to *Atelecyclus*, which is found both on the shores of Europe and Chili, but is distinguished by its narrower, three-spined front, the spinuliferous, not dentated, antero-lateral margins of the carapace, and the shorter, more truncated merus-joints of the exterior maxillipedes.

Hypopeltarium spinosulum (White).

Atelecyclus spinosulus, White, Ann. and Mag. Nat. Hist., ser. 1, vol. xii. p. 345, 1843.
Peltarion spinulosum, White, List Crust. Brit. Mus., p. 52, 1847.
„ „ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 304, pl. xviii. fig. 6, 1852.
„ „ Cunningham, Trans. Linn. Soc. Lond., vol. xxvii. p. 494, 1871.
„ „ Miers, Proc. Zool. Soc. Lond., p. 68, 1881.
Peltarion magellanicus, Jacquinot and Lucas, Crust. in Voy. au Pole Sud. Zool., vol. iii. p. 83, pl. viii. fig. 1, 1853.

Off the coast of Chiloe, 45 fathoms, Station 304 (a small male); Port Stanley, Falklands (a fine male taken in the trawl); near the same locality, 5 to 12 fathoms, Station 315 (five males and a female); Station 316, 4 to 5 fathoms (a small male).

Adult ♂.	Lines.	Millims.
Length of carapace, and breadth, about	22½	47

Gomeza, Gray.

Gomeza, Gray, Zool. Miscell., p. 39, 1831.
Œidea, de Haan (subgenus, in part), Crust. in v. Siebold, Fauna Japonica, p. 15, 1833.

Carapace elongated, dorsally convex, and granulated, with the lateral margins rounded and armed with teeth or spines along their whole length; the front is narrow, compressed, laminated; it projects over the bases of the antennules, and is emarginate or biemarginate at the distal extremity. The orbits are small, and are armed with a prominent tooth or spine at their interior angle, and with a smaller spinuliferous lobe at the interior sub-ocular angle. The epistoma is distinct and transverse. The longitudinal ridges of the endostome are developed, but do not reach the anterior margin of the buccal cavity. The post-abdomen of the male is five to seven-jointed. The eyes are short and completely retractile within the orbits. The antennules are longitudinally plicated; the antennæ terminate in long flagella, sometimes exceeding the body in length, their basal joints are moderately dilated and reach the margin of the front, they occupy the space between the antennulary fossettes and the orbits from which the antennal flagella are excluded. The merus-joints of the endognathi of the exterior maxillipedes are either distally

truncated or narrowed and rounded, and bear the next joint at their antero-internal angles. The chelipedes (in the adult) are of moderate length, usually somewhat unequal, with the merus trigonous; carpus armed with a strong spine on its inner margin; palm short, compressed; dactyli distally acute and dentated on the inner margins. The ambulatory legs are rather slender and of moderate length, with the joints smooth; dactyli in all slender, styliform.

One species of this genus, *Gomeza bicornis*, is rather common in the Indo-Malaysian, Japanese, and Australian Seas, another, *Gomeza serrata*, Dana, occurs on the coasts of Chiloe, Patagonia, and in the Straits of Magellan, in shallow water (to 30 fathoms).

Gomeza bicornis, Gray.

Gomeza bicornis, Gray, Zool. Miscell., p. 39, 1831; Crust. in Griffith, Animal Kingdom of Cuvier, vol. xiii. p. 296, pl. xxiv. fig. 1, 1833; List Crust. Brit. Mus., p. 52, 1847.
Corystes (*Œidea*) *viginti-spinosa*, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 44, pl. ii. fig. 5, 1835.
Gomeza viginti spinosa, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. x. p. 52, pl. iii. fig. 5, 1874.

Celebes Sea, 10 fathoms (Station 212), lat. 6° 54′ 0″ N., long. 122° 18′ 0″ E. A small female.

♀.	Lines.	Millims.
Length of carapace, about	7½	15
Breadth of carapace, ...	5	10·5

Legion IV. THELPHUSINEA.

Thelpheusiens, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 7, 1837.
Thelphusinæ, Milne Edwards, Ann. d. Sci. Nat., Zool. xx. p. 207, 1853.
Thelphusinea or *Cancroidea Grapsidica*, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, pp. 145, 292, 1852.

This section of the Cyclometopa includes in Dana's system those terrestrial or fluviatile crabs which are intermediate in structure between the typical Cancroidea (Cancridæ) and certain Catometopa (Gecarcinidæ). They resemble these latter in their terrestrial habits, and approach them in many particulars of structure, *e.g.*, in the form of the carapace, which is more or less dilated at the branchial regions, and in the usually spinuliferous dactyli of the ambulatory legs, but as in other Cancroidea the male verges pass directly through the basal joint of the fifth ambulatory legs and not through sternal ducts, and the carpal joint of the endognath of the exterior maxillipedes is articulated with the merus at or near its antero-internal angle or at the apex, not at the antero-external angle.

This group includes the single family Thelphusidæ.

Thelphusa, Latreille.

Thelphusa, Latreille, Nouv. Dict. d. Hist. Nat., ed. 2, vol. xxxiii. p. 500, 1819.
,, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 10, 1837 ; Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 209, 1853.
,, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. v. p. 163, 1869, et synonyma.
,, Kingsley, Proc. Acad. Nat. Sci. Philad., p. 35, 1880.

Carapace transverse, with the antero-lateral margins arcuated and usually armed with a single tooth, placed at a short distance behind the tooth or lobe at the exterior angle of the orbit, sometimes moderately convex, with a more or less distinct post-frontal crest, sometimes very convex, and the post-frontal crest obsolete. Front deflexed, of moderate width. Orbits usually without marginal fissures, and with the interior sub-ocular lobe but little developed. Epistoma narrow, transverse. Endostome not longitudinally ridged. Post-abdomen (in the male) usually distinctly seven-jointed. Eyes of moderate size. Antennules transversely plicated and usually almost concealed beneath the front. The basal joint of the antennæ is very short, and does not always reach the frontal margin; the short flagellum lies within the anterior hiatus of the orbit. The ischium-joint of the exterior maxillipedes is not produced at its antero-internal angle; the merus is small, usually distally truncated, with the antero-external angle rounded, the antero-internal angle (at or near which the next joint articulates with the merus) slightly emarginate. The chelipedes (in the males) are well developed and usually unequal, with the merus trigonous; carpus with a strong spine on its inner margin, palm rounded above; fingers usually not so long as the palm, distally acute, and dentated on the inner margins. The ambulatory legs are rather long, with styliform dactyli, which are armed with spinules disposed in longitudinal series.

The described species of *Thelphusa* are very numerous; one, the common *Thelphusa fluviatilis*, occurs not only on the shores of the Mediterranean, but also in Asia Minor, Syria and Persia; the others are found in all the warmer temperate and tropical regions of the Old World, extending southward to the Cape of Good Hope, Madagascar and Australia, but not to New Zealand; a species (*Thelphusa chilensis*) occurs in Chili.

The genus may be divided into three sections or subgenera, characterised mainly by the form (when developed) of the postfrontal crest; the Challenger collection includes a species belonging to each of these sections, which are connected with one another by insensible gradations.

I. Carapace moderately convex, but little dilated in front of the branchial regions, with the epibranchial tooth usually distinctly developed. Postfrontal crest distinct, but not continuous. Typical *Thelphusæ*.

The species are mostly Mediterranean and Asiatic.

II. Carapace moderately convex, usually antero-laterally dilated, with sometimes one

or more lateral teeth developed in front of the epibranchial tooth. Postfrontal crest extending in an unbroken line from the median incision to the antero-lateral margins. *Potamonautes*, MacLeay.

The species are mostly African.

III. Carapace dorsally very convex and dilated in front of the branchial regions, with the post-frontal crest and epibranchial tooth obsolete or nearly obsolete. *Geothelphusa*, Stimpson.

Species mostly Indo-Malaysian, Japanese and Australian.

Thelphusa nilotica, Milne Edwards, which has a continuous post-frontal crest, and the carapace armed with lateral marginal spines behind the epibranchial tooth, should perhaps be regarded as the type of a fourth section of the genus.

The following are species which were inadvertently omitted from the most recent list of species of the genus (that published by Mr. Kingsley in 1880) or have been since described :—

Thelphusa borneensis, v. Martens. Borneo.
Thelphusa dubia, B. Capello. West Africa.
Thelphusa kuhlii, de Man. Java.
Thelphusa limula, Hilgendorf. Senegambia.
Thelphusa longipes, A. Milne Edwards. Pulo Condore, China Sea.
Thelphusa madagascariensis, A. Milne Edwards. Madagascar.
Thelphusa pealiana, Wood-Mason. Assam.
Thelphusa sumatrensis, Miers. Sumatra.[1]

Thelphusa sinuatifrons (?), Milne Edwards, var. (Pl. XVIII. fig. 1).

Thelphusa sinuatifrons, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 211, 1853 (?).
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. v. p. 177, pl. x. fig. 2, 1869 (?).
„ „ Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. v. p. 305, 1880.

Philippines, Mindanao, Pasananca (in the river). An adult male and female are referred to this species.

The female agrees nearly with the description of A. Milne Edwards in the obscurely trisinuated frontal margin, and in other characters.

The male presents a very curious and remarkable variation in the form of the front, which I am inclined, however, to regard merely as an individual peculiarity, since it differs in no other particulars from the other example from the same locality. The front,

[1] I have quite recently proposed the names *Thelphusa cumingii* and *Thelphusa leichardti*, as alternative designations for specimens which are allied to but may be distinct from *Thelphusa crassa*, A. Milne Edwards, and have described a new variety, *johnstoni*, from Kilimandjaro, Eastern Africa, of *Thelphusa depressa*, Krauss.

instead of presenting an obscure median and two lateral sinuses is divided into two lobes by a deep, triangular median notch (see the figure). I have never observed such a variation to anything like the same degree in any other species of the genus.[1]

These specimens have the following dimensions :—

	Lines.	Millims.
Adult ♂.		
Length of carapace, nearly	13	27
Breadth of carapace, nearly	16½	34·5
Adult ♀.		
Length of carapace, nearly	14	29
Breadth of carapace,	17½	38

Thelphusa (*Potamonautes*) *perlata*, Milne Edwards.

Thelphusa perlata, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 13, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 209, 1853.
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. v. p. 179, pl. ix. fig. 3, 1869.
„ „ MacLeay, Annulosa in Smith, Zool. of South Africa, p. 64, 1849, *Potamonautes*, in text.

South Africa, Wellington and Cape Town (in the rivers). A good series is in the collection.

The largest male has the following dimensions :—

	Lines.	Millims.
Adult ♂.		
Length of carapace,	22	46·5
Breadth of carapace,	30½	64·5
Length of large chelipede,	47½	100·5

The postfrontal crest is distinct and continuous in the smallest specimen in the series, a male, whose carapace is not 4 lines (8·5 mm.) in length, and 5 lines (10 mm.) in width.

Thelphusa (*Geothelphusa*) *dehaanii*, White.

Cancer (*Thelphusa*) *berardii*, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 52, pl. vi. fig. 2, 1835.
Thelphusa dehaanii, White, List Crust. Brit. Mus., p. 30, 1847.
„ „ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 212, 1853.
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. v. p. 174, 1869, and references to synonyma.

Japan, in paddy fields near Lake Biwa, May 1875 (a male); at Hakona, at an elevation of 2,500 feet above the sea-level, May 1875 (two small males); near Kobé, June 1875 (three males).

[1] An obscure median excavation of the front is, however, occasionally seen, as for instance in an adult male *Thelphusa africana*, A. Milne Edwards, in the collection of the British (Natural History) Museum.

Scarcely any indications of a postfrontal crest exist in this species, but the protogastric prominences are obscurely developed. Ordinarily there is no lateral epibranchial tooth, the antero-lateral margins of the carapace being simply granulated, but occasionally, as in the specimen collected near Lake Biwa, it is distinctly defined. This, the largest specimen, has the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace, about	9½	20·5
Breadth of carapace, ...	12	25·5

CATOMETOPA or OCYPODIIDEA.

Quadrilatera, Latreille (pt.), Fam. Nat. du Règne Anim., p. 269, 1825.
Catomètopes, Milne Edwards (pt.), Hist. Nat. Crust. vol. i. p. 264, vol. ii. p. 1, 1834–37.
Ocypodidæ, Milne Edwards (pt.) Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 140, 1852.
Grapsoidea, Dana, U.S. Explor. Exped., vol. xiii., Crust., pp. 67, 306, 1852.
Catometopa, Miers, Cat. New Zeal. Crust., p. 32, 1876.

Carapace broad in front, often subquadrate, sometimes subglobose, truncated or arcuated anteriorly, but not rostrated. Epistoma short, often almost linear. Afferent branchial channel as in the Oxyrhyncha. The carpal joint of the exterior maxillipedes inserted at the summit, or more usually at the antero-external angle of the merus, very rarely at its antero-internal angle. Branchiæ usually fewer than nine in number. The male verges are inserted either in the sternum itself or in the basal joints of the last pair of legs, thence passing through channels in the sternum beneath the post-abdomen.

Family I. GEOCARCINIDÆ.

Gécarciniens, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 16, 1834.
Gecarcindea, Milne Edwards (pt.), Ann. d. Sci. Nat., vol. xviii. p. 200, 1852.
Gecarcinidæ, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 374, 1852.

Carapace dorsally very convex, and especially dilated over and in front of the branchial regions, with the antero-lateral margins usually entire and very strongly arcuated; the front of moderate width and strongly deflexed. Orbits and eye-peduncles of moderate size. The post-abdomen of the male usually covers at the base the whole width of the sternum, between the bases of the ambulatory legs. The carpal joint of the exterior

maxillipedes is sometimes inserted at the antero-external angle of the merus, sometimes at the apex or near its antero-internal angle, and may be completely concealed beneath the merus. The chelipedes in the adult male are very robust and usually unequally developed. The dactyli of the ambulatory legs are nearly always granulated and armed with spines disposed in longitudinal series.[1]

Geocarcinus, Leach.

Geocarcinus, Leach, Trans. Linn. Soc. Lond., vol. xi. p. 322, 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 26, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 201, 1853.

Carapace transverse and anteriorly convex, with the mesogastric and cervical sutures strongly defined, and the branchial regions antero-laterally convex and greatly developed; the antero-lateral margins not distinctly dentated. The front is deflexed and narrow or of moderate width, anteriorly truncated, nearly reaches the anterior margin of the buccal cavity, and almost completely covers the antennules. Orbits of moderate size, with the superior margins subentire, no distinct tooth at the exterior angle, and with a well-marked hiatus in the inferior margin, near the interior subocular lobe, which is in contact with the front, and excludes the short antennæ from the orbit. No distinct ridges are developed upon the endostome or palate. The post-abdomen in the male is usually distinctly seven-jointed. The eyes are set on rather short, thick pedicels. The antennæ are very short and occupy the angle formed by the contact of the inner subocular lobe of the orbit with the front, their basal joint is slightly dilated and does not reach the frontal margin. The exterior maxillipedes bulge out externally, and enclose a lozenge-shaped interspace; ischium and merus are broad, the ischium not produced at the antero-internal angle, merus distally rounded and prolonged so as almost entirely to conceal the following joints, it has sometimes a fissure in the antero-lateral margin; the following joint is articulated with the merus on its inner surface. The chelipedes (in the adult male) are considerably developed and usually unequal; merus trigonous and somewhat elongated; carpus without a spine on the interior margin; palm rounded above; fingers distally acute and dentated on the inner margins. The ambulatory legs are robust and somewhat elongated, with the penultimate and terminal joints, and sometimes the antepenultimate joint, compressed, and armed with spinules disposed in longitudinal series.

The species included in this genus are not numerous and inhabit, for the most part, the West Indian Islands, Brazil, Central America and California. One species, *Geocarcinus lagostoma*, has apparently a very extensive range, *i.e.*, from Australasia (?) to the Cape

[1] In *Uca* they are compressed and unarmed.

of Good Hope and West African coast, and thence to Ascension Island and Bermuda (see below).

The following are species which have been described since Milne Edwards' account of the genus in 1853 :—

Geocarcinus planatus, Stimpson. California, near Cape St. Lucas.

Geocarcinus depressus, Saussure. West Indies, Hayti. This species is perhaps not distinct from *Geocarcinus lagostoma*.[1]

Geocarcinus lagostoma (?) (Pl. XVIII. fig. 2).

? *Geocarcinus lagostoma*, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 27, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 203, 1853.

Two adult females, from Ascension Island, are referred to this species.

The largest specimen has the following dimensions :—

Adult ♀.	Lines.	Millims.
Length of carapace,	33½	71
Breadth of carapace,	43½	92

A small male from Bermuda differs so slightly from small examples of *Geocarcinus lagostoma* that I do not venture to separate it as a distinct species. It is distinguished principally by the form of the merus of the outer maxillipedes, which, although notched as in *Geocarcinus lagostoma*, has the antero-external lobe less produced and rounded, so that the notch is more nearly terminal than in the specimens of *Geocarcinus lagostoma* I have examined. The spinules of the inferior margin of the penultimate joints of the ambulatory legs, which are well developed in small specimens of *Geocarcinus lagostoma*, are, in the specimen from Bermuda, nearly obsolete. In the coloration it nearly resembles specimens of *Geocarcinus lateralis*.

This specimen may perhaps be referable to *Geocarcinus depressus*, Saussure,[2] in which, however, the maxillipedes (as figured) are of rather different form.

The specimen from Bermuda is of the following dimensions :—

♂.	Lines	Millims.
Length of carapace,	15½	32·5
Breadth of carapace,	18½	39

Geocarcinus lagostoma has been but briefly described, and never, I believe, figured. I think it useful, therefore, to figure the adult female from Ascension Island in the Challenger collection, to facilitate its identification by future authors. The adult males

[1] *Geocarcinus barbatus*, Pœppig, from Chili, is thought by Milne Edwards (*tom. cit.*, p. 205, 1853), to be a species of *Cardisoma*; *Geocarcinus regius*, Pœppig, also from Chili, is perhaps not a *Geocarcinus*.

[2] *Vide Mém. Soc. Phys. d. Genève*, vol. xiv., pt. ii. p. 439, pl. ii. fig. 14, 1858.

differ little from the females in the series I have examined. They sometimes, but not invariably, have larger and more robust chelipedes.[1]

Cardiosoma, Latreille.

Cardiosoma, Latreille (*Cardisoma*), Encycl. Méth. Hist. Nat., vol. x. p. 685, 1825.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 22, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 203, 1853.
„ S. J. Smith (*Cardiosoma*), Trans. Connect. Acad., vol. ii. p. 142, 1870.

Carapace transverse, elevated, and sometimes very convex anteriorly; with the branchial regions antero-laterally convex, and very greatly developed, as in *Geocarcinus*. The antero-lateral margins are sometimes armed with a small tooth placed at a short distance from that at the exterior angle of the orbit. Front deflexed, and usually broader than in *Geocarcinus*; it nearly reaches the anterior margin of the buccal cavity, and conceals, in part, the antennules. Orbits large and widely open, with the margins entire; the interior subocular lobe is separated by a wide hiatus from the frontal margin, and this hiatus is occupied by the antennæ. Endostome without distinct longitudinal ridges. Post-abdomen (in the male) distinctly seven-jointed. Eye-peduncles of moderate size and thickness; they do not nearly fill the orbital cavities. The basal joint of the antennæ is short and somewhat dilated, and does not usually quite reach the frontal margin; the flagellum is very short. The exterior maxillipedes do not meet along their inner margins, but enclose a lozenge-shaped interspace; the ischium and merus-joints of the endognathi are rather broad and truncated, the merus even rather concave at the distal extremity; the carpal joint is articulated with the merus at its antero-external angle. The chelipedes are usually unequal, and the larger one sometimes (*Cardiosoma guanhumi*) enormously developed; merus more or less trigonous; carpus usually with a spine on its interior margin; palm often shorter than the fingers, which, as usual, are more or less distinctly dentated on the inner margins. Ambulatory legs robust, and more or less elongated; the merus-joints with the superior margins acute, and armed with a subterminal spine; dactyli as in *Geocarcinus*, armed with spinules ranged in longitudinal series.

The species of this genus which, like *Geocarcinus*, are terrestrial or subterrestrial, are not numerous, and their discrimination is often difficult.[2]

One, *Cardiosoma carnifex* (Herbst) = ? *Cardiosoma obesum*, Dana, *Cardiosoma*

[1] The types of these species were from the Australasian seas, whence also there is a good series of specimens in the British Museum collection, obtained during the voyage of H.M.SS. "Erebus" and "Terror"; the Museum also possesses a specimen designated as from the Cape of Good Hope, and another from the West African Coast (Fraser). With these specimens the Challenger examples apparently agree in all particulars. In adult specimens of large size the branchial regions are very considerably dilated, and the granulated line which defines their antero-lateral margins is partially or even entirely obsolete. In the smallest examples this line is very distinct, but the lateral series of spinules on the dactyli of the ambulatory legs is not developed, and they are therefore armed with only four (marginal) series of spinules.

[2] Several of the species here placed provisionally as synonymous with *Cardiosoma carnifex*, are regarded by M. de Man (*Notes Leyden Mus.*, ii. pp. 31–36, 1879) as distinct species, but A. Milne Edwards is inclined upon the whole to doubt their specific distinctness (*Nouv. Archiv. Mus. Hist. Nat.*, vol. ix. p. 264, 1873).

hirtipes, Dana, *Cardiosoma urvillei*, Milne Edwards, is widely distributed throughout the Oriental region; another, *Cardiosoma armatum*, Herklots, occurs on the West Coast of Africa and at the Cape Verde Islands; a third, *Cardiosoma guanhumi*, Latreille = *Cardiosoma diurnum*, Gill (*fide* Smith), and *Cardiosoma quadratum*, Saussure (*fide* von Martens), is common at the West Indies and Florida Keys, and occurs also in Brazil and at the Cape Verde Islands (Stimpson); a fourth, *Cardiosoma cressum*, Smith (= *Cardiosoma latimanus*, Lockington?), inhabits the West Coast of America and Lower California; and a fifth, *Cardiosoma* (*?*) *barbiger* (Pœppig) referred to by Milne Edwards as *Cardiosoma barbatus*, occurs in Chili.

Cardiosoma guanhumi, Latreille.

Cardisoma guanhumi (Latreille), Milne Edwards, Hist. Nat. Crust., vol. ii. p. 24, 1837; Atlas in Règne Animal de Cuvier, ed. 3, pl. xx. fig. 1; Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 204, 1853.

Cardiosoma guanhumi, S. J. Smith, Trans. Connect. Acad., vol. ii. p. 143, pl. v. fig. 3, 1870, where references to synonyma.

Bermuda, April 1873 (two adult males).

The largest example has the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace, about	46	98
Breadth of carapace,	56½	120

Cardiosoma armatum, Herklots.

Cardisoma armatum, Herklots, Addit. Faun. Carcin. Africæ occidentalis, p. 7, pl. i. figs. 4, 5, 1851.

„ „ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 205, 1853.

„ „ de Man, Notes Leyden Mus., ii. No. 5, p. 32, 1879.

Cape Verde Islands, Porto Praya, St. Jago (an adult female).

Adult ♀.	Lines.	Millims.
Length of carapace,	32½	69
Breadth of carapace,	40½	86

This species is always distinguishable from the Oriental *Cardiosoma carnifex* by the more strongly spinuliferous merus and granulated palm of the chelipedes.[1]

Cardiosoma carnifex (Herbst).

Cancer carnifex, Herbst, Naturgesch. der Krabben u. Krebse, vol. ii. p. 163, pl. xli. fig. 1 ♂, 1794.

Cardisoma carnifex (Latreille), Milne Edwards, Hist. Nat. Crust., vol. ii. p. 23, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 204, 1853.

„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 264, 1873.

„ „ de Man, Notes Leyden Mus., ii. No. 5, p. 31, 1880.

Specimens were in the Challenger collection from the following localities :—

Tracey Island, Nares Harbour, Admiralty Islands (three adult males and an adult

[1] *Cf.* Hilgendorf, *Monatsber. d. k. preuss. Akad. d. Wiss. Berlin*, p. 801, 1878.

female); Kandavu, Fiji Islands (an adult female); Tahiti, September 30, 1875 (two adult males and two females); Papiete (Tahiti), September and October, 1875 (three adult males and an adult female).

An adult male from Tracey Island measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace, about	31½	67
Breadth of carapace, about	40	85

The Challenger examples fall into two very distinct series which may thus be characterised:—In the first, to which belong the specimens from Tahiti, the carapace is moderately tumid at the branchial regions; the postfrontal and postorbital prominences of its dorsal surface are not very prominent; the exterior orbital tooth is prominent, although small, and is followed rather closely by the epibranchial tooth; the antero-lateral margins are defined by a very distinct raised line, which extends halfway along the postero-lateral margins, and the exterior subocular angle of the carapace is about a right angle. These are apparently the form distinguished by M. de Man as the typical *Cardiosoma carnifex*. In the second form, to which belong the specimens from the Admiralty Islands and Kandavu, the carapace is much more swollen and arched at the branchial regions, the postfrontal and postorbital prominences are much more prominent, the exterior orbital tooth less prominent, the lateral epibranchial tooth more remote from that at the outer angle of the orbit; the raised line defining the antero-lateral margins of the carapace is shorter, and the exterior subocular angle more acute. I may add that the merus of the exterior maxillipedes generally narrows more decidedly to its base in the typical *Cardiosoma carnifex*.

This form may, I think, be identified with *Cardiosoma hirtipes* of de Man (*tom. cit.*, p. 34), though perhaps not of Dana, but the basal antennal joint is usually somewhat excavated, and the chelipedes in the male are often unequally developed.

Family II. Ocypodidæ.

Ocypodiens, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 39, 1837.
Macrophthalmidæ (pt.), Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, pp. 308, 312, 1852.
Ocypodiaceæ, Milne Edwards (pt.), Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 140, 1852.

Carapace usually moderately convex, cancroid or trapezoidal, with the antero-lateral margins straight or arcuated, but the branchial regions not greatly dilated, as in the Geocarcinidæ; the front of moderate width, or very narrow. Orbits and eye-peduncles sometimes of moderate size, sometimes very greatly developed. The post-abdomen does not always cover the sternum at the base between the bases of the fifth ambulatory legs. The carpal joint of the endognath of the exterior maxillipedes is inserted at the antero-internal, or, rarely, at the antero-external angle of the merus. The chelipedes (in the

adult males) are usually of moderate size, sometimes rather slender and very considerably elongated; the dactyli of the ambulatory legs are styliform and are not armed with strong spines as in the Geocarcinidæ.

The species are for the most part small and littoral or shallow-water forms, but occasionally occur in deep water.

Subfamily 1. Carcinoplacinæ.

Carapace transverse, usually convex, and more or less cancroid in form, with the antero-lateral margins arcuated, spinose, or dentated, rarely entire. Frontal region usually of moderate width, orbits rather small. The post-abdomen at the base usually covers the whole width of the sternum between the bases of the fifth ambulatory legs. The fifth joint of the exterior maxillipedes articulates at the antero-internal angle of the merus. Chelipedes in the adult male usually subequal, and sometimes considerably elongated. Ambulatory legs moderately elongated, slender, with the dactyli styliform, sometimes compressed.

The genus *Pseudorhombila* must be taken as the type of this family, since in it the characters are most evident, and it is the only genus included in the Histoire Naturelle des Crustacés; moreover the designation has priority over *Carcinoplax*, which is the name proposed by Milne Edwards in 1852, for the species of *Curtonotus*, de Haan, *Curtonotus* having been previously used in the Coleoptera.

The genera have been divided into the following sections, which are apparently connected by insensible gradations :—

1. Euryplacinæ.

Euryplacinæ, Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 150, 1870.
Eucratopsinæ, Stimpson, *tom. cit.*, vol. ii. p. 151, 1870.

In this section the antero-lateral margins of the carapace are dentated or spinose, and the post-abdomen in the male does not entirely cover the sternum at the base. In the typical genera, which are nearly related to the Cancroidea through *Panopeus* and *Galene*, the last segment of the sternum is exposed at the anterior corners only; these genera are, *Euryplax*, Stimpson, *Panoplax*, Stimpson, *Eucratopsis*, S. J. Smith, and perhaps *Glyptoplax*, Smith (this genus is placed by Milne Edwards in the Cancroidea near *Panopeus*).

In other genera, *e.g.*, *Speocarcinus*, Stimpson, *Eucratoplax*, A. Milne Edwards, and *Prionoplax*, Milne Edwards (if this genus truly belongs here), the post-abdomen of the male is much narrower at the base, and a large part of the posterior segment of the sternum is exposed.

The genera of this section, except perhaps the typical species of *Prionoplax*, are all American, and are not represented in the Challenger collection.

2. Carcinoplacinæ.

Carcinoplacinæ, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 164, 1852.

In this section the antero-lateral margins of the carapace are usually dentated or spinose, and the post-abdomen completely conceals the sternum at the base (except rarely in *Pilumnoplax*).

The genera referred to the section Carcinoplacinæ are:—*Carcinoplax*, Milne Edwards (= *Curtonotus*, de Haan); *Pseudorhombila*, Milne Edwards; *Geryon*, Kröyer (= *Chalæpus*, Gerstaecker); *Eucrate*, de Haan; *Litocheira*, Kinahan (= *Brachygrapsus*, Kingsley); *Pilumnoplax*, Stimpson; *Heteroplax*, Stimpson; *Bathyplax*, A. Milne Edwards; *Frevillea*, A. Milne Edwards; and *Camptoplax*, Miers; also perhaps *Catoptrus*, A. Milne Edwards, and *Libystes*, A. Milne Edwards, where the form of the post-abdomen in the male is not known, and *Camptandrium*, Stimpson, which is regarded by Dr. Stimpson as the type of a distinct family (Camptandriidæ).

3. Rhizopinæ.

Rhizopinæ, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 95, 1858.

In this section the antero-lateral margins of the carapace are entire or subentire, and the post-abdomen in the male very rarely covers the whole width of the sternum at the base. The genera included in it are *Scalopidia*, Stimpson (= *Hypophthalmus*, Richters); *Rhizopa*, Stimpson; *Typhlocarcinus*, Stimpson; *Ceratoplax*, Stimpson; *Notonyx*, A. Milne Edwards; *Xenophthalmodes*, Richters; and perhaps *Cryptocœloma*, Miers.

The species are all of small size and are almost exclusively Oriental or Indo-Pacific forms.

Carcinoplacinæ.

Carcinoplacinæ, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 164, 1852.

Geryon, Kröyer.

Geryon, Kröyer, Nat. Hist. Tidskr., ser. 1, vol. i. p. 20, 1837.
? *Chalæpus*, Gerstæcker, Archiv f. Naturgesch., vol. xxii. p. 118, 1856.

Carapace cancroid in form, moderately convex, slightly broader than long; the antero-lateral margins shorter than the postero-lateral margins, and armed normally with three spines, including the spine or tooth at the exterior angle of the orbit, which is sometimes less developed; the intermediate spines (the second and fourth of the normal series) are sometimes present but rudimentary. Front slightly deflexed, of moderate width, and divided into two or four lobes or teeth. Epistoma short, transverse. The ridges of the endostome or palate are faintly indicated or obsolete (in the species I

have examined). The post-abdomen in the male is distinctly seven-jointed, and covers the whole width of the sternum at the base between the bases of the fifth ambulatory legs. The eye-peduncles are short and robust. The antennules are transversely plicated. The basal antennal joint is slender, and occupies the interior hiatus of the orbit, and its distal extremity is free, not united to the front. The merus of the exterior maxillipedes is shorter than the ischium, truncated or slightly rounded at the distal extremity, and the next joint is articulated at its antero-internal angle. The chelipedes (in the male) are subequal and moderately robust; merus trigonous; carpus with a spine or tooth on its interior surface; palm short, rounded above and below; fingers distally acute and denticulated on the inner margins. The ambulatory legs are somewhat elongated, with the joints subcylindrical; dactyli slender, styliform, but slightly compressed and not ciliated.

The genus *Geryon* is very nearly allied both to *Pseudorhombila* and *Pilumnoplax*, and to the Cancroid genus *Galene;* it is distinguished from them by the considerable development of the lateral marginal spines of the carapace, and from *Pseudorhombila*, as figured by Milne Edwards, by the more slender basal antennal joint, which does not reach the front.

The species, which occur at considerable depths in the North Atlantic, may attain a large size. The following have been described:—

Geryon tridens, Kröyer. Danish and Scandinavian Coasts; off Valentia, Ireland (80 to 808 fathoms).

Geryon quinquedens, Smith. Nova Scotia and East Coast of the United States (to 740 fathoms).

Geryon longipes, A. Milne Edwards. Mediterranean and North Spanish Coasts (to 700 metres).

Geryon (?) incertus, n. sp. Off the Bermudas (435 fathoms, Station 33).[1]

Geryon (?) incertus, n. sp. (Pl. XVI. fig. 3).

This species is represented in the collection by the carapace of a single specimen (probably immature), since it is of very small size, and as the fifth ambulatory legs are deficient, I am somewhat uncertain as to its generic identification. It may belong to a genus of the Portunidæ, near to *Bathynectes*, where I originally placed it.

The carapace is little broader than long; its surface is very uneven and marked with transverse granulated ridges, of which there are two on the gastric region, placed one on either side of the median line, and one (a continuous ridge) crossing the

[1] On account of the form of the basal antennal joint, which is said to resemble that of *Galene*, de Haan, the genus *Chalæpus*, Gerstæcker, is identified with *Geryon*, rather than with *Pseudorhombila*, but the identification is somewhat uncertain; the typical species *Chalæpus trispinosus* (Herbst), is said to occur in the East Indies.

middle of the carapace and originating on each side from the base of the posterior antero-lateral marginal tooth, from behind which, also, a granulated ridge extends along the postero-lateral margins of the carapace nearly to the postero-lateral angles, which are rounded, not spiniform, and not prominent. The orbit has two small incisions in its superior margin. The antero-lateral margins are shorter than the postero-lateral margins and are armed with four teeth; of which the first, second, and fourth are prominent and spiniform, the third is almost obsolete on one side and exists on the other merely as a small tubercle. The front is rather prominent, about one-third the width of the carapace, and divided by a small median notch into two broad and slightly sinuated lobes, which are rounded at the lateral angles. The post-abdomen (in the female) is subtriangulate, with the segments short, the fourth to the sixth apparently partly coalescent, the last segment rounded at the distal extremity. The antennules are transversely plicated; the basal joint very large. The basal antennal joint is slender, and longer than the two following peduncular joints, but it is free and not conjoined with the infero-lateral process of the front, as in that genus; the flagellum is somewhat elongated. The ischium of the exterior maxillipedes is longer than broad, with the inner margin convexly arcuated; the merus is almost as long as broad (and much shorter than the ischium), it is subtruncated at its distal extremity, with the antero-external angle rounded and not at all prominent, and is scarcely at all emarginate at the antero-internal angle, where the next joint is articulated with it. No limbs remain attached to this specimen, but two ambulatory legs, which occurred in the same tube, and probably belong to it, are moderately elongated and very slender, with the joints smooth; the dactylus styliform, nearly straight, elongated, slightly longer than the penultimate joint (see figs. 3*b*, 3*c*). Colour (in spirit) whitish.

Young ♀.	Lines.	Millims.
Length and breadth of carapace,	2½	5
Length of ambulatory leg, about	5½	11·5

Off the Bermudas, in 435 fathoms, in lat. 32° 21′ 30″ N., long. 64° 35′ 55″ W., Station 33 (a young female).

From all the described species of this genus, *Geryon incertus* is distinguished by the form of the front, and from the typical species of *Bathynectes*, Stimpson, not only by this character, but also by the structure of the basal antennal joint, which is free and not united with the lateral subfrontal process.

Pilumnoplax, Stimpson.

Pilumnoplax, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 93, 1858.

Carapace moderately transverse, and longitudinally slightly convex, or rather depressed; the antero-lateral margins are very short, much shorter than the postero-lateral

margins, and are armed with three or four teeth, which are rarely as spinuliform as in *Pilumnus*, to which this genus is somewhat nearly allied. The front is of moderate width, slightly deflexed, and distally truncated, and often has a small median notch in the anterior margin. The orbits are of moderate size, and their margins are sometimes notched, but not spinuliferous. The epistoma is very narrow and transverse. The ridges of the endostome or palate are very obscurely defined. The post-abdomen in the male is distinctly seven-jointed, and is broadest at the base, where it covers the whole, or nearly the whole, width of the sternum, between the bases of the fifth ambulatory legs. The eyes are set upon rather short, stout pedicels. The antennules are transversely or somewhat obliquely plicated. The basal antennal joint is short and rather slender, and usually does not reach the infero-lateral process of the front; the flagellum arises from within the interior orbital hiatus. The exterior maxillipedes are closely applied to the buccal cavity; their ischium and merus-joints are distally truncated, the merus shorter than the ischium, and bearing the next joint at its antero-internal angle, which is very slightly, if at all, emarginated. The chelipedes are either subequal or unequal in the male, and if unequal, the palms may be dissimilarly tuberculated; the merus-joint of the larger chelipede is trigonous, and prolonged little, if at all, beyond the antero-lateral margins of the carapace; the carpus has a spine on its antero-internal margin; the palm is compressed, rounded above, and tuberculated or smooth on the exterior surface; the fingers are distally acute and denticulated on the inner margins. Ambulatory legs moderately elongated, with the joints slender and unarmed; the dactyli usually styliform, but slightly compressed, and ciliated on the margins.

The species are all of small size, and inhabit the Chinese, Japanese, and Australian Seas, in water of moderate depth. *Pilumnoplax heterochir*, Studer, is a deep-water species occurring in the Challenger collection, near the Cape of Good Hope, on the Agulhas Bank and at Nightingale Island (Tristan da Cunha group), in 100 to 150 fathoms; and I have described a variety (*atlantica*) of the Oriental *Pilumnoplax sulcatifrons*, Stimpson, from Senegambia (Goree Island). In the Challenger collection is another deep-water species, *Pilumnoplax abyssicola*, n. sp., from the Fiji Islands (315 fathoms).

The following is, I believe, a complete list of the species which have been assigned to this genus, but not improbably some others which have been referred to allied genera may hereafter be included in it:—

Pilumnoplax sulcatifrons, Stimpson. Hong Kong; Port Molle, North-East Australia (var. *australiensis*, Miers), and Goree Island, Senegambia (var. *atlantica*, Miers).

Pilumnoplax longipes, Stimpson. Oosima, Japan.

Pilumnoplax sculpta, Stimpson. Oosima, Japan.

Pilumnoplax ciliata, Stimpson. Limoda, Japan.

Pilumnoplax vestita (de Haan). Japan; North and North-East Australia (var. *sexdentata*, Haswell).

Pilumnoplax heterochir (Studer). Off Cape of Good Hope and Agulhas Bank (to 150 fathoms); Nightingale Island, Tristan da Cunha (100 fathoms).

Pilumnoplax abyssicola, n. sp. Fiji Islands (315 fathoms).

The nearest ally to this genus is perhaps *Pseudorhombila*, Milne Edwards, of which I formerly regarded *Pilumnoplax* a subgenus,[1] but the species of *Pilumnoplax* may be distinguished by their much smaller size, and by the narrower basal antennal joint and compressed and ciliated dactyli of the ambulatory legs. From the species of *Pilumnus*, and, I think, *Eucrate*, de Haan, *Pilumnoplax* is distinguished by the less convex carapace with shorter antero-lateral margins, and more slender, longer ambulatory legs, not to mention other more important but generally less constant characters.[2]

Pilumnoplax heterochir (Studer) (Pl. XIX. fig. 1).

Pilumnus heterochir, Studer, Abhandl. d. k. Akad. d. Wiss. Berlin, Abh. ii. p. 11, pl. i. fig. 3, 1882.

Pseudorhombila (*Pilumnoplax*) *normanni*, Miers, Narr. Chall. Exp., vol. i. pt. ii. p. 587, 1880.

The carapace is little broader than long, somewhat depressed, and granulated near the front and antero-lateral margins, and with short, obscurely defined, transverse ridges on the gastric region and on the front of the branchial regions. The antero-lateral margins are much shorter than the postero-lateral margins, which are straight and converge to the postero-lateral angles, and the former are divided into three teeth, of which the first is broad and obtuse, and the second and third dentiform and acute; behind these, on the postero-lateral margins, there is usually a small tuberculiform rudiment of a fourth tooth. The interorbital frontal carina is entire or slightly notched in the middle line and granulated; the frontal margin is divided into two lobes by a shallow, triangulate median notch. The orbit has two small notches in its superior margin, but none at its exterior angle or on its inferior margin. The third segment of the post-abdomen in the male is the broadest, and laterally angulated; the sixth segment is slightly longer than the fifth, the seventh segment slightly transverse and distally rounded. The eyes are of moderate size. The basal antennal joint is short and slender, and does not attain the lateral subfrontal process. The merus of the outer maxillipedes is shorter than the ischium-joint, distally truncated, with a rather prominent antero-external angle. The chelipedes (in the male) are unequal, the right usually the larger; the

[1] Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 241, 1884.

[2] As has been noted under *Pilumnus*, the European species described by Maitland as *Pilumnus tridentatus*, may belong to *Pilumnoplax* or to *Heteroplax*, which latter genus is, according to Dr. Stimpson's diagnosis, separated from *Pilumnoplax* by characters of scarcely more than subgeneric value. Besides the species mentioned by Dr. Stimpson, I have described one, *Heteroplax (?) nitidus*, from the Corean Seas.

merus and carpus-joints are granulated, and the carpus has usually two spiniform teeth on its inner margin; the palm (in the larger chelipede) is robust and somewhat turgid, granulated near the base, and elsewhere smooth; the fingers dentated on the inner margins and rather shorter than the palm; in the smaller chelipede both wrist and palm are externally covered with numerous, crowded, acute granules, and the fingers are relatively longer; the ambulatory legs are slender, with the superior margins of the fourth to the sixth joints granulated; dactyli styliform, slightly hairy, and terminating in a short claw. The male verges are inserted very near the bases of the fifth legs. Colour (in spirit) yellowish-brown; fingers black or brownish.

Adult ♂.	Lines.	Millims.
Length of carapace, about	3	6·5
Breadth of carapace, nearly	4	8

Off Nightingale Island, Tristan da Cunha Group, October 17, 1873, in 100 fathoms (a good series of specimens); Agulhas Bank, off Cape Agulhas, South Africa (Station 142), in lat. 35° 4′ 0″ S., long. 18° 37′ 0″ E., in 150 fathoms (several specimens).

This species is distinguished from all its congeners by the dissimilar development and tuberculation of the right and left chelipedes.[1]

Pilumnoplax abyssicola, n. sp. (Pl. XIX. fig. 2).

The carapace is everywhere closely granulated, nearly glabrous, with a scanty pubescence near the margins. The front is about one-third the greatest width of the carapace, its anterior margin is straight, entire, without a median notch, and is not transversely sulcated; the antero-lateral margins of the carapace are shorter than the postero-lateral, and armed with three teeth behind the exterior angle of the orbit, which is not at all prominent; the first tooth is very small (on one side scarcely discernible), the second and third spiniform and acute; the postero-lateral margins are straight, and converge to the postero-lateral angles of the carapace; the orbital margins are entire; the inner subocular lobe is small and not prominent. The epistoma is very short and transverse; the pterygostomian regions are finely granulated and somewhat pubescent; the post-abdomen of the male is triangulate, broad at the base, where it covers the whole of the sternal surface, its segments are distinct and short, the terminal segment subtriangulate. The eyes are borne on short, thick pedicels. The basal (or real second) joint of the peduncles of the antennæ is rather slender, and does not reach the subfrontal process. The merus of the outer maxillipedes is nearly quadrate, distally truncated, and not produced at the antero-external angle; the narrow straight exognath does not quite reach

[1] The foregoing description was drawn up, and the figure was outlined, before I had identified the Challenger specimens with Dr. Studer's species, and both may still be useful for the identification of this remarkable deep-water form, which in the preliminary account of the Brachyura published in the Narrative of the Challenger Expedition I had designated *Pseudorhombila* (*Pilumnoplax*) *normanni*.

the antero-external angle of the merus-joint. The chelipedes are moderately robust, with the joints very finely granulated; the merus short, trigonous, with an obscure tooth on its upper margin, near the distal extremity; carpus with a spine on its inner margin; palm without spines or tubercles, finely granulated, rounded above the fingers, distally acute and denticulated on the inner margins. The ambulatory legs are slender and somewhat elongated, with the joints slightly compressed, but not dilated, pubescent, and clothed on the margins with some longer hairs; the dactyli are slender, styliform, and about as long as the penultimate joints. Colour (in spirit) yellowish-white; fingers of the chelipedes chocolate-brown.

♂.	Lines.	Millims.
Length of carapace, about	4	9
Breadth of carapace, about	4½	10
Length of a chelipede,	6½	13·5
Length of second ambulatory leg,	9	19

Off Matuku, Fiji Islands, in 315 fathoms (Station 173), in lat. 19° 9′ 35″ S., long. 179° 41′ 50″ E. (a male, perhaps not fully grown).

The bases of the male verges (external genital appendages) originate very near the bases of the fifth ambulatory legs.

Pilumnoplax vestita, var. *sexdentata* (Haswell).

? *Cancer* (*Curtonotus*) *vestitus*, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 51, pl. v. fig. 3 ♀, 1835.

? *Carcinoplax vestitus*, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 164, 1852.

? *Eucrate sexdentata*, Haswell, Cat. Australian Crust., p. 86, 1882.

Pseudorhombila vestita, var. *sexdentata*, Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 240, 1884.

Japan, off Yokoska, 10 fathoms (a female, not fully adult?); Japanese Seas, 15 fathoms, in lat. 34° 18′ 0″ N., long. 133° 35′ 0″ E., Station 233B (a young female).

The specimens referred to this species resemble de Haan's description of the male in that the pubescence of the chelæ covers only the upper part of the palm and the base of the dactylus; the spines of the antero-lateral margins are more strongly defined than in his figure of the female; the small spine of the outer surface of the wrist is obsolete, and the ambulatory legs (of the first three pairs especially) less hairy. It may be, therefore, that the Challenger specimens belong to a distinct but nearly-allied species.[1] The largest specimen has the following dimensions:—

♀.	Lines.	Millims.
Length of carapace,	4½	9·5
Breadth of carapace,	5½	11·5

[1] Whether or not this species be identical with the very briefly-described *Eucrate sexdentatus*, Haswell, must remain uncertain. Haswell's types were from the North-Eastern Coast of Australia (Port Denison, 20 fathoms). The Challenger specimens certainly belong to the same species as those from the Arafura Sea, referred to in my Report on the Crustacea of H.M.S. "Alert," as *Pseudorhombila vestita*, var. *sexdentata* (Haswell).

Bathyplax, A. Milne Edwards.

Bathyplax, A. Milne Edwards, Bull. Mus. Comp. Zoöl., vol. viii., No. 1, p. 16, 1880.

In this genus the carapace is slightly transverse, longitudinally convex and finely granulated on the dorsal surface; the branchio-cardiac sutures are distinct. The antero-lateral margins are arcuated and armed with two spines (the hepatic and lateral epibranchial spines). The front is deflexed, and is more than one-third the width of the carapace; its straight anterior margin projects over the bases of the antennules. The orbits are very small and rudimentary. The epistoma is very narrow and transverse. The longitudinal ridges of the endostome or palate are rather indistinctly defined in the specimens I have examined. The post-abdomen of the male is short, distinctly seven-jointed, and occupies at the base the whole width of the sternum between the bases of the fifth ambulatory legs. The eye-peduncles are very short and nearly immobile, and the corneæ in the typical form are not developed. The flagella of the antennules are elongated and transversely plicated. The basal antennal joint is much larger than the next joint, and reaches the infero-lateral process of the front; the elongated flagella arise from within the interior hiatus of the orbits. The exterior maxillipedes are short, and their exognath is rather broad; the ischium of the endognath is not produced at its antero-internal angle; the merus is distally truncated; its antero-external angle is not produced, and its antero-internal angle, where the next joint articulates, is emarginated. The chelipedes are dissimilar and of moderate length; the merus is short, trigonous, with a spine on its superior margin, and it has on the inner surface a transverse stridulating ridge near the distal extremity; the carpus has a spine or tubercle on its inner surface; the palms are short and compressed, and the left palm (but not the right) has lobe or tubercle on the inner surface, near the superior margin; the dactyli are compressed, dentated on the inner margins, and distally acute. The ambulatory legs are slender and somewhat elongated; their dactyli styliform and straight.

Of the single species described there is in the Challenger collection an interesting variety which I have designated—

Bathyplax typhlus, var. *oculiferus*, nov. (Pl. XX. fig. 3).

cf. Bathyplax typhlus, A. Milne Edwards, Bull. Mus. Comp. Zoöl., vol. viii., No. 1, p. 16, 1880.

South of Pernambuco, off the coast of Brazil, in 30 to 400 fathoms (Stations 122 to 122c), lat. 9° 5′ 0″ to 9° 10′ 0″ S., long. 34° 49′ 0″ to 34° 53′ 0″ W. (An adult female bearing ova.)

The dimensions of this specimen are as follows :—

Adult ♀.	Lines.	Millims.
Length of carapace,	8	17
Greatest breadth of carapace,	9	19
Length of right chelipede,	15½	33
Length of second ambulatory leg,	17½	37

This variety differs from the type of the species, as described by Milne Edwards, in one character only, and that which constituted the most distinctive peculiarity of the type, *i.e.*, in having the small ocular peduncles provided with distinct, small, terminal corneæ. I may add, that the ambulatory legs are not only hispid with short hairs, but also fringed with longer hairs. In all other characters, as, *e.g.*, in its being furnished with a stridulating ridge at the distal extremity of the merus-joint of the chelipedes, and in the curious dissimilarity of the right and left chelæ, this specimen agrees with the typical form of the species.[1]

Litocheira, Kinahan.

Litocheira, Kinahan, Journ. Roy. Dublin Soc., vol. i. p. 121, 1858.
? *Brachygrapsus*, Kingsley, Proc. Acad. Nat. Sci. Philad., p. 203, 1880.

Carapace broader than long, somewhat quadrilateral, with the sides nearly straight; the antero-lateral margins armed with a tooth or spine behind the exterior angle of the orbit. The front is straight or slightly arcuated, and (in the species I have examined) it is rather broad, usually exceeding half the width of the carapace, and the orbital margins are entire. The epistoma is transverse. The ridges of the endostome are distinctly developed (in the species I have examined). The post-abdomen in the male and the basal segments cover the whole width of the sternum, between the bases of the fifth ambulatory legs. The eye-peduncles are robust and of moderate length, the corneæ large. The basal joint of the antennæ is slender and rather longer than the following joint, and usually does not reach the infero-lateral process of the front; the antennal flagellum is moderately elongated. The exterior maxillipedes meet, or nearly meet, along their inner margins; their ischium-joints are not produced at the antero-internal angles; the merus-joints are distally truncated, and the antero-lateral angles (where the next joint articulates) are slightly emarginate; the antero-external angles not greatly produced. The chelipedes in the adult male are subequal and of moderate length, with the merus-joints

[1] It is worthy of note that the specimens described by Milne Edwards from the collections obtained in the Expedition of the U.S.S. "Blake," under the superintendence of Professor A. Agassiz, in 1877 to 1879, were dredged at Frederickstadt and Santa Lucia at a much greater depth (423 to 451 fathoms). The Rev. A. M. Norman (in Wyville-Thomson, Depths of the Sea, p. 176), mentions a somewhat analogous modification of the ocular peduncles in *Ethusa granulata*, where the eyes are smooth and rounded in specimens dredged in 110 to 370 fathoms, but are firmly fixed in their sockets, and assume the functions of a rostrum, in the specimens (of more northerly habitat) dredged in 542 and 705 fathoms.

trigonous, palms somewhat inflated and rounded above, and rounded or subcarinated below, fingers distally acute and denticulated on the inner margins. The ambulatory legs are rather slender and of moderate length; dactyli styliform or lanceolate.

The following species are to be referred to this genus:—

Litocheira bispinosa, Kinahan. Port Philip (15 fathoms); Bass Strait; Port Curtis; King George's Sound (Coll. Brit. Mus.).

Litocheira (?) *lævis* (= *Brachygrapsus lævis*, Kingsley). New Zealand.

Litocheira kingsleyi, n. sp. Agulhas Bank, 150 fathoms (Station 142).

Litocheira kingsleyi, Miers (Pl. XXI. fig. 1).

Brachygrapsus kingsleyi, Miers, Narr. Chall. Exp., vol. i. pt. ii. p. 587, 1880.

The body and limbs are rather thinly pubescent. Carapace quadrate, very slightly broader than long, with the sides nearly straight, longitudinally it is slightly convex and arcuate, it has a prominent spiniform tooth at the outer angle of the orbit, and a second at a short distance behind it on the lateral margin. The front is nearly half the width of the carapace, curves slightly downwards, and is divided by a median notch into two rounded lobes, external to which, at the inner angle of the orbit, is an inconspicuous tooth. The margins of the rather large orbits are granulated, without fissures. The epistoma is transversely linear. The post-abdomen of the male is rather narrow, with the sides slightly convergent, as in *Naitilograpsus*, the segments are thinly pubescent, the third to the sixth segments coalescent, the terminal segment small and subtriangulate; the ocular peduncles are moderately robust and hairy, with the corneæ terminal. The antennules are transversely plicated. The basal antennal joint is short, and does not quite reach the infero-lateral process of the front, the next joint more slender and slightly longer, the terminal peduncular joint short, the flagellum about fourteen-jointed. The exterior maxillipedes are formed nearly as in *Trapezia;* ischium longer than broad, with an obscure obliquely longitudinal sulcus on the outer surface; merus small, distally truncated, with the antero-external angle rounded and very slightly prominent, and bearing the next joint at the antero-internal angle; exognath very slender, narrow, and distally acute. Chelipedes in the male moderately developed; merus very finely denticulated on its anterior margin; carpus with a small tooth on its inner margin, anterior to which the margin is granulated; palm slightly inflated, and obscurely granulated on its outer surface and more distinctly on its upper margin; fingers about as long as the palm, denticulated on the inner margins, slightly incurved, and distally acute; ambulatory legs rather elongated, with the merus-joints dilated and compressed, and armed with a spiniform tooth near to the distal extremity of the upper margin; the following joints slender and very hairy; dactyli armed below with a series of short spines, and with a small terminal claw. Colour (in spirit) reddish-brown.

The largest male presents the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace, rather over,	5	11
Breadth of carapace, nearly	6	12
Length of a chelipede,	8½	18
Length of second ambulatory leg, nearly,	12	25

The smallest ova-bearing female measures as follows :—

Adult ♀.	Lines.	Millims.
Length and breadth of carapace, nearly,	4½	9
Length of a chelipede, about	6	13
Length of second ambulatory leg,	8½	18

A good series of specimens (mostly females) were dredged on the Agulhas Bank, south of Cape Agulhas, South Africa, in lat. 35° 4′ 0″ S., long. 18° 37′ 0″ E., in 150 fathoms (Station 142).

In this species the male verges are exserted near the margins of the sternum and the bases of the fifth ambulatory legs.

The pubescent body and limbs and the form of the front distinguish *Litocheira kingsleyi* from the other species referred to this genus.

Rhizopinæ.

Rhizopinæ, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 95, 1858.

This subfamily was established by Dr. Stimpson for certain small genera which resemble the Carcinoplacidæ in the form of the carapace, whose antero-lateral margins are arcuated, and in the characters drawn from the front, orbits and outer maxillipedes, but the antero-lateral margins of the carapace are usually entire, rarely dentated, and the post-abdomen of the male does not cover the whole width of the sternum at the base (except perhaps sometimes in *Typhlocarcinus*).

The characters distinguishing this group from the Carcinoplacidæ are not invariably constant,[1] but the genera referred to it are usually at once recognisable by their small size, small orbits, small and deflexed front, and by the arcuated, subentire, antero-lateral margins and subparallel postero-lateral margins of the carapace.

Ceratoplax, Stimpson.

Ceratoplax, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 96, 1858.

Carapace transverse, longitudinally convex and nearly smooth on the dorsal surface, with the antero-lateral margins arcuated and entire or subentire; the postero-lateral

[1] I have myself described a species of *Carcinoplax* (*Carcinoplax integra*) with entire antero-lateral margins.

margins nearly parallel. Front deflexed and rather narrow, with the anterior margin slightly arcuated and entire, or with an obscure median notch. Epistoma transverse. The ridges of the endostome are obsolete or imperfectly defined. The post-abdomen of the male is distinctly seven-jointed and it does not occupy nearly the whole width of the sternum at the base. The orbits are rather large, normally excavated, their superior margins are not (as in *Scalopidia*) nearly continuous with the front and antero-lateral margins; the eyes have the corneæ normally developed, the margins acute, ciliated. The antennules are transversely plicated. The basal joint of the antennæ is rectangular and usually does not reach the front; the flagellum is somewhat elongated. The exterior maxillipedes, when closed, have no interspace between them; the ischium-joint is longitudinally sulcated and is not produced at its antero-internal angle; the merus is truncated, shorter than the ischium, and is considerably produced at its antero-external angle; the following joint is articulated at the antero-internal angle of the merus, which angle is usually slightly emarginated. The chelipedes are subequal and of moderate size; merus trigonous and short; carpus with a spine on its interior margin; palm short and compressed, fingers distally acute. The ambulatory legs are moderately elongated, with the joints slender and unarmed; dactyli styliform.

From *Scalopidia* this genus is at once distinguished by the normally excavated orbits, and from *Typhlocarcinus* by the larger orbits, the form of the eye-peduncles and of the merus of the exterior maxillipedes, whose merus-joint is produced at the antero-external angle. It is much more nearly allied to *Rhizopa*, but, if I have rightly identified specimens in the British Museum collection with this genus, the form of the merus of the exterior maxillipedes will also, perhaps, suffice to distinguish it generically.

The following species have been referred to *Ceratoplax*:—

Ceratoplax ciliata, Stimpson. North China Sea (20 fathoms); Torres Strait.
Ceratoplax arcuata, Miers. North Australia, Port Darwin (12 fathoms); South of New Guinea (28 fathoms).
Ceratoplax (?) lævis, Miers. Arafura Sea (32 to 36 fathoms).

Ceratoplax ciliata, Stimpson (Pl. XIX. fig. 3).

Ceratoplax ciliata, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 96, 1858.

Torres Strait, August 1874 (a female). This specimen has the dorsal surface of the carapace clothed with a few hairs; the ambulatory legs, although compressed, are rather slender.

Adult ♀.	Lines.	Millims.
Length of carapace,	3	6·5
Breadth of carapace,	4	8·5

It is unfortunately in very imperfect condition, having lost the right chelipede and several of the ambulatory legs, which are rather more slender than in the description of Dr. Stimpson, and the front is subentire, not distinctly notched.

Ceratoplax arcuata, Miers.

Ceratoplax arcuata, Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 243, pl. xxv. fig. B, 1884.

A female specimen dredged south of New Guinea, in 28 fathoms, in lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (Station 188) is referred, but doubtfully, to this species.

This example is of much larger size than the small male described in the Report cited; the whole animal is more pubescent and the carapace proportionately broader; the subdistal tooth or prominence on the upper margin of the merus of the chelipedes, which is very obscurely indicated in the original type, is more distinctly developed.[1] It has the following dimensions :—

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	4½	9·5
Breadth of carapace,	5½	11·5

Notonyx, A. Milne Edwards.

Notonyx, A Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 268, 1873.

Carapace nearly quadrilateral, with the antero-lateral angles rounded, subcristated, and the lateral margins straight, entire, and subparallel; longitudinally it is slightly convex, and the dorsal surface smooth and polished. Front deflexed, about one-third the width of the carapace, with the anterior margin straight and entire. The orbits, antennæ and post-abdomen are nearly as in *Ceratoplax*. The eye-peduncles have the corneæ normally developed. The exterior maxillipedes are nearly as in *Ceratoplax*, but the merus-joint, in the specimens I have examined, is subquadrilateral, distally truncated, and is not produced at its antero-external angle. The chelipedes are subequal and moderately developed; merus trigonous; carpus with a tubercle or prominence, not a spine, on its interior surface; palm short and compressed, cristated below; fingers distally acute. The ambulatory legs, as in *Ceratoplax*, are slender and moderately elongated, with the joints unarmed; dactyli nearly straight.

[1] I very much doubt the generic distinctness of *Rhizopa gracilipes*, Stimpson (from Hong-Kong), from this species. In specimens, probably from the Chinese Seas, referred doubtfully to *Rhizopa gracilipes* in the British (Natural History) Museum, the ocular corneæ are minute and inferior as in *Ceratoplax*, but the merus of the exterior maxillipedes is not produced at its antero-external angle; the basal antennal joint is more robust and quadrate. In the fully grown specimen the frontal margin is entire, and the palms of the chelipedes are cristate and externally glabrous, as in Stimpson's description.

The single species, *Notonyx nitidus*, which has been referred to this genus, occurs, but rarely, at New Caledonia and the Fiji Islands, and has been taken by the Challenger off the south coast of New Guinea in 28 fathoms.

Notonyx is very nearly allied to *Ceratoplax*, and were it not for a slight difference in the form of the merus of the exterior maxillipedes, could, I think, hardly be distinguished from that genus.

Notonyx nitidus, A. Milne Edwards.

Notonyx nitidus, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 269, pl. xii. fig. 3, 1873.

South of New Guinea, 28 fathoms, in lat. 9° 59′ S., long. 139° 42′ E. (Station 188). An adult but small male and an adult female.

Adult ♀.	Lines.	Millims.
Length of carapace, rather over	3	7
Breadth of carapace, rather over	4	9

In these specimens, the slender basal antennal joint does not quite reach the subfrontal process; the merus of the exterior maxillipedes, as in the description of Milne Edwards, is not produced at the antero-external angle, and herein differs from the figure cited, where it is shown as slightly produced.

Subfamily 2. Ocypodinæ.

Ocypodiens, Milne Edwards, Hist. Nat. Crust. vol. ii. p. 39, 1837.
Gonoplaciens (pt.), Milne Edwards, *tom. cit.*, p. 56, 1837.

Carapace transverse, trapezoidal or quadrate, with the antero-lateral angles frequently produced and acute, and the lateral margins straight, entire or incised; front narrow or of moderate width. Orbits usually very considerably developed and occupying nearly the whole or a great part of the anterior face of the body below the front. The fifth joint of the exterior maxillipedes usually articulates at the antero-external angle of the merus. Chelipedes in the adult male subequal, or sometimes very unequal. Ambulatory legs moderately elongated, with the dactyli styliform, compressed, not spinose.

I divide the genera of this group into three sections, as follows:—

1. Ocypodinæ.

Carapace trapezoidal with the antero-lateral margins not greatly produced, and entire; the fifth joint of the endognath of the exterior maxillipedes articulated at its apex, or at

its antero-external angle; the post-abdomen in the male usually much narrower than the sternum at the base.

Genera:—*Ocypoda*, Fabricius; *Gelasimus*, Latreille; *Acanthoplax*, Milne Edwards (perhaps to be regarded as a subgenus of *Gelasimus*); *Cleistostoma*, de Haan; *Helœcius*, Dana.

2. Gonoplacinæ.

Gonoplaces cancérgides, Milne Edwards (pt.), Ann. d. Sci. Nat., ser. 3, vol. xviii. p. 162, 1852.

Carapace trapezoidal, with the antero-lateral angles produced and spiniform; the fifth joint of the endognath of the exterior maxillipedes articulated with the merus at its antero-internal angle; post-abdomen in the male occupying the whole width of the sternum, between the bases of the fifth ambulatory legs.

Genera:—*Gonoplax*, Leach, and *Ommatocarcinus*, White.[1]

3. Macrophthalminæ.

Gonoplaces vigils, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 155, 1852.
Macrophthalminæ, Dana, U.S. Explor. Exped., vol. xiii., Crust., p. 312, 1852.

Carapace transverse and quadrate, depressed, and dentated behind the antero-lateral angles, which are not greatly produced. Front narrow or of moderate width. The post-abdomen in the male does not cover the whole width of the sternum at the base, between the coxal joints of the fifth ambulatory legs. The fifth joint of the endognath of the exterior maxillipedes is articulated with the merus at or near its antero-external angle.

Genera:—*Macrophthalmus*, Latreille; *Euplax*, Milne Edwards (= *Chænostoma*, Stimpson, subgenus); *Hemiplax*, Heller; *Rhaconotus*, Gerstæcker; *Ilyoplax*, Stimpson.

Ocypodinæ.

Ocypoda, Fabricius.

Ocypoda, Fabricius (pt.), Entom. Syst. Suppl. p. 347, 1798.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 41, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 141, 1852.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 179, 1880.
„ Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. x. p. 376, 1882.

Carapace quadrate, moderately transverse and convex, with the dorsal surface closely granulated, the lateral margins entire, the cervical and cardiaco-branchial sutures in part

[1] The genus *Prionoplax*, Milne Edwards, which that author arranges with these genera, is, I think, better placed in the family Carcinoplacidæ; it is intermediate in structure between *Pseudorhombila* and *Macrophthalmus*.

distinct, the antero-lateral angles moderately prominent. The front (as in *Macrophthalmus* and *Gelasimus*) is very narrow and deflexed; the orbits are very large and open, and extend along the whole anterior face of the body, between the front and antero-lateral angles (which are not very prominent), and their inferior margins are usually divided by a hiatus or fissure. The ridges of the endostome are usually not developed. The post-abdomen in the male is narrow and distinctly seven-jointed, with the terminal segment small and triangulate. The eye-peduncles are very large, and are jointed near the base, the basal part is short, and the terminal portion is often prolonged at its distal extremity as a spine or tubercle; the corneæ, which are of great size, cover a great part of the inferior surface of the mobile portion of the eye-peduncles. The antennules are partially concealed by the front; the antennæ are very small, and are placed beneath the eye-peduncles in the narrow hiatus between the bases of the antennules and the interior subocular lobe of the orbit; their basal joints are very short, and the flagella scarcely exceed the peduncles in length. The exterior maxillipedes are closely applied to the buccal cavity; the ischium-joints are longer than the merus-joints, and are distally truncated; the merus-joints are longer than broad, distally truncated, not emarginated at the antero-internal angles, and the next joint is articulated at the antero-external angle of the merus. The chelipedes in the adult male are unequal and well developed; the merus-joint in the larger chelipede is trigonous, with the superior and inferior margins denticulated; carpus short, with usually a lobe or tooth on the inner margin; hand vertically deep and compressed, the palm with a stridulating ridge on its inner surface (except in *Ocypoda cordimana*), composed of a vertical series of short raised lines or tubercles; fingers either distally acute or truncated, and denticulated on the inner margins. The ambulatory legs are somewhat elongated, with the joints usually granulated and the dactyli styliform.

The species are found on the shores of nearly all the warmer temperate and tropical regions of the globe.

Ocypoda ceratophthalma (Pallas).

Cancer ceratophthalmus, Pallas, Spicilegia Zoologica, p. 83, pl. v. figs. 7–8, 1772.
Ocypoda ceratophthalma, Fabricius, Entom. Syst. Suppl., p. 347, 1798.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 48, 1834; Crust. in Cuvier, Règne Anim., ed. 3, Atlas, pl. xvii. fig. 1.
„ „ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 179, 1880, and references to synonyma, except *Ocypoda ægyptiaca*.
„ „ Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. x. p. 379, pl. xvii. fig. 1, 1882.

North Australia, Raine Island, August 1874 (an adult male); Fiji Islands, Kandavu (a series of specimens, male, female, and young).

The adult male from Raine Island measures as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace, about	17½	37·5
Breadth of carapace, nearly	20	42

In this specimen the terminal styles of the ocular peduncles are normally developed, and project considerably beyond the antero-lateral angles of the carapace, and the tubercles and striæ of the stridulating ridge of the larger chelipede are distinct and well defined.

In the larger specimens from Kandavu (length of carapace 12½ lines, 26 mm.) the terminal styles of the ocular peduncles are very short and tuberculiform, as in the variety of this species, designated by Milne Edwards *Ocypoda brevicornis*;[1] in the smaller specimens (length of carapace 9 lines, 19 mm., or under), the ocular styles are obsolete and the eyes distally rounded. An adult female from Kandavu, which is probably an abnormal variety of this species, has short terminal ocular styles, but scarcely any trace of a stridulating ridge on the inner margin of the palm of the larger chelipede, and the fingers of the smaller chelipede are slightly dilated at the distal extremity, in which character this specimen exhibits some approach to *Ocypoda macrocera*. There is also in the Challenger collection a series of specimens (not fully grown) from the Arrou Islands, which I suppose belong to *Ocypoda ceratophthalma* rather than to *Ocypoda kuhlii*, because (although the terminal styles of the ocular peduncles are not developed) the stridulating ridge of the chelipedes (in the larger specimens in the series) is coarsely striated above, finely striated below, and the antero-lateral angles of the carapace are but slightly prominent.

Young specimens from the Philippine Islands (Samboangan, 10 fathoms), may belong either to this species or to *Ocypoda kuhlii*; they have no trace of the terminal ocular styles, but the stridulating ridge of the chelipedes is striated rather than tuberculated, as in *Ocypoda kuhlii*.

A young male from Hilo, Sandwich Islands (beach) has no indications of ocular styles, but the stridulating ridge is coarsely and evenly striated, as in the adult examples from these islands referred to in my paper on the genus (*tom. cit.*, p. 380).

Small specimens of *Ocypoda* (too young to be assigned to any species with certainty) are in the Challenger collection, from the South Australian Coast, 2 to 10 fathoms (April 1874), from the beach at Botany Bay, and from Matuku, Fiji Islands, "freshwater" (July 24, 1874). The length of the carapace in the largest of these specimens (that from Matuku) does not exceed 4½ lines (9 mm.). None present any indications of terminal ocular styles. In the specimen from Matuku, and in one from the South Australian Coast, a striated stridulating ridge is very obscurely indicated, and these specimens may also presumably be young examples of *Ocypoda ceratophthalma*.

[1] Hist. Nat. Crust., vol. ii. p. 48, 1837.

Ocypoda cursor (Linné).

Cancer cursor, Linné (pt.), Syst. Nat., ed. xii. p. 1039, 1766.
Ocypoda ippeus, Olivier, Voy. dans l'Empire Ottoman, Atlas, pl. xxx. fig. 1.
" " Audouin, Explic. des planches in Savigny, Descr. de l'Egypte, Atlas, pl. i. fig. 1.
" " Milne Edwards, Hist. Nat. Crust., vol. ii. p. 47, 1837.
" " Moseley, Notes by a Naturalist on the Challenger, pp. 48, 49, woodcut, 1879.
" *cursor*, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 29, 1835.
" " Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 142, 1852.
" " Kingsley, Proc. Acad. Nat. Sci. Philad., p. 182, 1880.
" " de Man, Notes Leyden Mus., p. 248, 1881.
" " Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. x. p. 378, 1882.
" " Studer, Abhandl. d. k. Akad. d. Wiss. Berlin, Abh. ii. p. 13, 1882.

Cape Verde Islands, St. Vincent, July 1873 (a large series of specimens, adult and young); St. Jago, Cape Verde Islands, August 1873 (an adult male).

The largest male in the series from St. Vincent has the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace,	17	36
Greatest breadth of carapace,	20½	43·5

In the adult examples of large size, the pencil of setæ borne at the end of the eye-peduncles, characteristic of this species, is long and thick; in the smaller specimens, however, it is little developed, and in immature specimens of small size no trace of it exists, and the eye-peduncles are rounded at the distal extremity. The stridulating ridge of the chelipedes, which in adult examples of both sexes is finely and evenly striated throughout its length, is absent from the very smallest examples in the Challenger series.

Ocypoda arenaria (Catesby).

Cancer arenarius, Catesby, Hist. of the Carolinas, vol. ii. p. 35, pl. xxxv., 1731, 1771.
Ocypoda arenaria, Say, Journ. Acad. Nat. Sci. Philad., vol. i. p. 69, 1817.
" " Milne Edwards, Hist. Nat. Crust., vol. ii. p. 44, pl. xix. figs. 13, 14, 1837.
" " Kingsley, Proc., Acad. Nat. Sci. Philad., p. 184, 1880, and references to synonyma.
" " Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. x. p. 384, pl. xvii. fig. 7, 1882.
" *rhombea*, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 46, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 143, 1852.
" " Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 322, pl. xix. fig. 8, 1852.

Bermuda (an adult female), Bahia; shallow water (an adult male).

Adult ♂.	Lines.	Millims.
Length of carapace, about	14½	31
Breadth of carapace,	17½	37

Gelasimus, Latreille.

Gelasimus, Latreille, Nouv. Dict. d. Hist. Nat., ed. 2, vol. xviii. p. 286, 1880.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 49, 1837; Ann. d. Sci. Nat., ser. 3, vol. xviii. p. 144, 1852.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 135, 1880.

Carapace transverse, longitudinally convex, usually smooth on the dorsal surface, but sometimes granulated, with the cervical and cardiaco-branchial sutures usually more or less distinctly defined, with the antero-lateral angles usually prominent and acute, and the lateral margins nearly straight, and convergent to the posterior margin. The front is deflexed, usually very narrow, almost linear between the bases of the eye-peduncles, but sometimes much broader, and at the base nearly equalling one-third the width of the carapace at the anterior margin. The orbits are very large and, as in *Macrophthalmus*, extend along the whole anterior surface of the carapace, between the front and antero-lateral margins. The longitudinal ridges of the endostome are usually more or less distinctly developed. The post-abdomen in the male is narrow and distinctly seven-jointed, and its base does not occupy the whole width of the sternum between the bases of the ambulatory legs. The eye-peduncles (as in *Macrophthalmus*) are very slender and elongated, reaching, or nearly reaching, the antero-lateral angles of the carapace. The antennulary flagella are usually somewhat obliquely plicated. The basal joint of the antennæ is small, and placed beneath the bases of the eye-peduncles; the flagella are of moderate length. The ischium of the exterior maxillipedes is much larger than the merus, and is not produced at its antero-internal angle; the merus is small, usually transverse, distally truncated, and not emarginated at the antero-internal angle, and the following joint is articulated at the antero-external angle of the merus. The chelipedes are very unequally developed, either the right or left may be the larger in the same species; the merus in the larger chelipede is usually trigonous and prolonged beyond the antero-lateral angles of the carapace; the carpus is moderately elongated, and has usually no spine on its interior surface; the hand is compressed and enormously developed, usually greatly exceeding in length the three preceding joints; the palm is much shorter than the fingers, and is usually obliquely cristated on the inner surface; the fingers are distally acute or subacute, granulated, and usually lobated on the inner margins; in the smaller chelipede (and in both chelipedes in the female) the joints are slender and feeble. The ambulatory legs are of moderate length and present nothing remarkable; the merus-joints are compressed, and the dactyli styliform.

The described species are extremely numerous, and occur in all the warmer temperate, subtropical, and tropical regions of the globe. The two which are mentioned below have been described since the publication of Mr. Kingsley's list.

Gelasimus thomsoni, Kirk. New Zealand (Wellington).
Gelasimus cimatodus, Rochebrune. Senegambia.

The nearest ally to this genus is *Helœcius*, Dana, which is distinguished by the equal chelipedes and somewhat differently shaped post-abdomen of the male, which is broader at the base, &c.

The genus *Acanthoplax*, Milne Edwards, is united by Kingsley with *Gelasimus*, and cannot, I think, be regarded as more than a subgenus; it is distinguished, according to Milne Edwards, merely by having the branchial regions of the carapace armed with a marginal series of large spiniform tubercles.

Gelasimus vocans (Linné).

?? *Cancer vocans*, Linné, Syst. Nat., ed. xii. p. 1041, 1766.
Gelasimus vocans, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 145, pl. iii. fig. 4, 1852, *nec.* Hist. Nat. Crust.
Gelasimus nitidus, Dana, U.S. Explor. Exped., vol. xiii., Crust., p. 316, pl. xix. fig. 5, 1852.

Fiji Islands, Kandavu (an adult male); Arrou Islands (an adult male).

The form thus designated is distinguished by the form of the larger chelipede in the male, whose palm is coarsely and strongly granulated externally, with the pollex or lower finger externally concave at the base, and bearing two strong triangular lobes, situated, one at about the middle of its inner margin, and one near to the distal extremity (besides a smaller sub-basal tooth on the inner margin, which is not always present). The figures cited give an excellent representation of this species.

Mr. Kingsley, in his recent Revision of the Gelasimi,[1] refers to this species as *Gelasimus cultrimanus*, Adams and White, but in the specimens designated by White *Gelasimus cultrimanus*, in the collection of the British Museum, the larger chelipede in the male is much more elongated, the proximal tooth of the two large triangular teeth of the pollex is always wanting, and the distal one is much less prominent and triangulate, and these specimens certainly belong to a distinct species or a very distinct and well marked variety. It may become necessary, for the reasons urged by Kingsley, to abandon the designation *Gelasimus vocans* for this species altogether.[2]

Adult ♂.	Lines.	Millims.
Length of carapace, rather over	6	13
Breadth of carapace,	9	19

[1] *Proc. Acad. Nat. Sci. Philad.*, p. 140, pl. ix. fig. 7, 1880.

[2] I retain, for the present, the Linnean name for this species, because it is so used by Milne Edwards in his later monograph of the group, and by other authors. If, however, the Linnean designation be properly referable to *Gelasimus tetragonon*, or to any other species, it will be necessary to use Dana's designation, *Gelasimus nitidus*, for the present form, since his figure (*tom. cit.*, pl. xix. fig. 5c) certainly belongs to it.

Gelasimus rubripes, Jacquinot and Lucas.

Gelasimus rubripes, Jacquinot and Lucas, Crust. in Voy. au Pole Sud. Zool., iii. p. 66, pl. vi. fig. 2, 1853.
„ „ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 148, pl. iv. fig. 12, 1852.
„ „ Kingsley, *tom. cit.*, p. 145, pl. x. fig. 17, 1880.

Philippines, Samboangan, 10 fathoms (an adult male). This specimen agrees well with the figure of Jacquinot and Lucas.

Specimens of this species, which have two triangular teeth on the inner margin of the palm, might at first sight be mistaken for *Gelasimus vocans*, but the series referred to *Gelasimus rubripes*, in the British Museum collection, may always be distinguished by having the dactylus granulated at and near the base and longitudinally sulcated on its outer surface.

Adult ♂.	Lines.	Millims.
Length of carapace, about	8½	18·5
Breadth of carapace, nearly	13	27·5

Gelasimus tetragonon (Herbst).

? *Cancer tetragonon*, Herbst, Naturgesch. der Krabben u. Krebse, Heft 1, p. 257, pl. xx. fig. 110, 1782, ♀.
Gelasimus tetragonon, Rüppell, Beschreib. 24 Arten kurzschwänzigen Krabben d. rothen Meeres, p. 25, pl. v. fig. 5, 1830.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 52, 1857; Ann. d. Sci. Nat., *tom. cit.*, p. 147, pl. iii. fig. 9, 1852.
„ „ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 143, pl. ix. fig. 11, 1880, where references to literature.

Two males were obtained at Tahiti, near the reefs, and three at Papiete, in the same island, on the shore and at the river mouths; also a male and two females at the Arrou Islands.

This species varies much in the coloration and in the tuberculation of the larger chelipede, whose fingers are granulated on the inner margins and bear ordinarily two or three larger tubercles, but these latter are sometimes absent from the inner margins of one or both fingers. The coloration in the Challenger spirit specimens is purplish-brown, with irregular pale markings; the chelipedes yellowish, with a large red patch at the base of the pollex, which extends sometimes over the whole outer surface of the palm.

Adult ♂.	Lines.	Millims.
Length of carapace,	10	21
Breadth of carapace, nearly	15	31·5

Gelasimus annulipes, Milne Edwards.

Gelasimus annulipes, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 55, pl. xviii. figs. 10–13, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 149, pl. iv. fig. 15, 1852.
" " Hilgendorf, Monatsber. d. k. preuss. Akad. d. Wiss. Berlin, p. 803–805, 1878.
" " Kingsley, Proc. Acad. Nat. Sci. Philad., p. 148, pl. x. fig. 22, 1880, and references to literature, in part only.
" *porcellanus*, White, Proc. Zool. Soc. Lond., p. 85, 1847; Crust. in Zool. H.M.S. "Samarang," p. 50, 1848.
" " Milne Edwards, *tom. cit.*, p. 151, 1852.
" " Kingsley, *tom. cit.*, p. 155, 1880.
" *perplexus*, Milne Edwards, Ann. d. Sci. Nat., *tom. cit.*, p. 150, pl. iv. fig. 18, 1852; *fide* Hilgendorf, *tom. cit.*, p. 806, 1878.
" *marionis*, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 53, 1837, not of Desmarest (?)
" *splendidus*, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 99, 1858.
" " Kingsley, *tom. cit.*, p. 149, 1880.
" *pulchellus*, Stimpson, *tom. cit.*, p. 100, 1858.
" *rectilatus*, Lockington, Proc. Calif. Acad. Nat. Sci., pt. 1, p. 148, 1876; *fide* Kingsley.
" *annulipes*, var. *albimana*, Kossmann, Zool. Ergebn. einer Reise Küstengeb. d. rothen Meeres, Brachyura, p. 53, 1877.

Philippines, Samboangan, 10 fathoms (three males); Fiji Islands, Kandavu (a good series of specimens, mostly males); Matuku (three males and two females).

Adult ♂.	Lines.	Millims.
Length of carapace, about	3½	7·5
Breadth of carapace,	6	13

In the specimens I refer to this species the carapace is moderately convex, smooth, and shining; the front ordinarily subtruncated at the distal extremity, the posteriorly convergent lateral margins defined by a straight line, which proceeds from the rather prominent acute antero-lateral angles of the carapace nearly to the rounded postero-lateral angles. The larger chelipede in the adult male has the hand elongated, externally granulated, the palm about once and a half as long as broad, with a vertical impressed line near the base of the fingers, internally armed with an angulated, coarsely granulated prominence near the base, and with two short granulated ridges near the bases of the fingers, the fingers are granulated on their inner margins; the pollex has two or three larger teeth or prominences, of which one is usually situated at about the middle of the inner margin, and one (triangulate) near the distal extremity; the dactylus is flat externally, with the margins subparallel nearly to the distal extremity, which is strongly incurved, and has usually two or three larger granules on the inner margin.

In the smaller males the tubercles and prominences of the inner margin of the fingers

are often deficient, the subdistal triangulate tooth of the pollex or lower finger being that most permanent and characteristic of the species.[1]

Gonoplacinæ.

Gonoplax, Leach.

Gonoplax, Leach, Trans. Linn. Soc. Lond., vol. xi. p. 323, 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 60, 1837; Ann. d. Sci. Nat, Zool., vol. xviii. p. 162, 1852.

Carapace transverse, longitudinally rather convex, dorsally smooth, with the antero-lateral angles terminating in spines, which are not greatly produced, as in *Ommatocarcinus*. The front is deflexed, and rather less than one-third of the width of the carapace, and its anterior margin is straight; the orbits are well defined, and extend along the whole anterior margin of the body between the front and antero-lateral angles. The epistoma is transverse; the ridges of the endostome or palate are nearly obsolete; the post-abdomen in the male is rather broad, distinctly seven-jointed, and at the base covers the whole width of the sternum. The eye-peduncles are elongated. The antennules are transversely plicated. The basal antennal joint is small, and does not reach the infero-lateral process of the front, and the flagellum is somewhat elongated. The exterior maxillipedes present nothing remarkable; their ischium-joints are longitudinally sulcated, and are not produced at the antero-internal angles; the merus-joints are distally truncated, the antero-external angles not produced, and the antero-internal angles, where the next joint articulates, usually slightly emarginated. The chelipedes in the adult male are subequal and very considerably elongated; the merus-joints subcylindrical, and often exceeding in length the width of the carapace; carpus short, without a spine on the interior surface; palm about as long as the merus and compressed, fingers rather robust and compressed, dentated or tubercular on the inner margins, and distally acute. The ambulatory legs are moderately elongated and slender, with the dactyli styliform.

To the long known European and North Atlantic species of this genus is to be added an apparently new form, which I propose to designate *Gonoplax sinuatifrons*.

[1] I have thought it useful to give the leading references to the synonyma of this species, so far as I am acquainted with them, since Mr. Kingsley's are incorrect in some particulars, or incomplete. Thus the West American *Gelasimus macrodactylus*, Milne Edwards and Lucas, cannot, in my opinion, be regarded as synonymous with *Gelasimus annulipes*, but, as the description and figure and specimens in the British (Natural History) Museum show, is a species with much more convex carapace and less prominent antero-lateral angles, and with differently shaped chelipedes and fingers. *Gelasimus perplexus* is stated by Hilgendorf to be synonymous, not with *Gelasimus chlorophthalmus*, Milne Edwards, as stated by Kingsley, but with *Gelasimus annulipes*. *Gelasimus gaimardi*, Milne Edwards, may also possibly be a variety of this species, but specimens referred to it in the British Museum collection may be distinguished by the rounder front and more tapering and slender dactylus of the larger chelipede, while the palm has a cicatrice on its outer surface. *Gelasimus pulchellus*, Stimpson, from Tahiti, is, to judge from the short diagnosis, a species or variety intermediate between *Gelasimus annulipes* and *Gelasimus gaimardi*.

Gonoplax sinuatifrons, n. sp. (Pl. XX. fig. 2).

The carapace is shaped nearly as in *Gonoplax rhomboides* (Linné), *i.e.*, it is moderately convex in a longitudinal direction, transverse, with the antero-lateral angles prominent and spiniform, the lateral margins slightly tumid at the hepatic regions, and thence slightly convergent to the postero-lateral angles; the dorsal surface is smooth and glabrous. The front is rather less than one-third the width of the carapace, its anterior margin not straight, as in *Gonoplax rhomboides*, but with a wide, shallow, median sinus; the lateral angles are rounded. The upper and lower orbital margins are undulated nearly as in *Gonoplax rhomboides*, which this species closely resembles also in the form of the ocular peduncles, antennæ, and outer maxillipedes. Chelipedes, in the small female, of moderate length; merus with a small tooth near the middle of its upper margin, as in *Gonoplax rhomboides*, and with another on the inferior margin; carpus with a tooth on its inner margin, but with the small tooth of the outer surface (present in *Gonoplax rhomboides*) nearly obsolete; chela less elongated than in *Gonoplax rhomboides*, and deeper in proportion to its length; the palm is rounded above and carinated below as in the European species, and the fingers somewhat more robust. The ambulatory legs as in *Gonoplax rhomboides*. Colour (in spirit) yellowish brown.

Young ♀.	Lines.	Millims.
Length of carapace, rather over	3	7
Breadth of carapace, ...	$4\frac{1}{2}$	9·5
Length of a chelipede, ...	$6\frac{1}{2}$	13·5
Length of second ambulatory leg, ...	$8\frac{1}{2}$	18·5

The unique specimen (a female, probably not fully grown) was dredged at Amboyna, in 15 to 25 fathoms.

This specimen is only distinguishable from the well-known European *Gonoplax rhomboides* by slight differences in the form of the front and chelipedes, which are referred to above, but probably additional specific characters would be derived from adult male examples.

Ommatocarcinus, White.

Ommatocarcinus, White, Append. in Stanley, Voy. H.M.S. "Rattlesnake," vol. ii. p. 393, pl. v. fig. 1, 1852.
„ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 163, 1852.

Carapace transverse, longitudinally rather convex, with the dorsal surface smooth, the sides converging slightly to the posterior margins; the antero-lateral angles prolonged as long spines. The front is very narrow, less than one-sixth the anterior width of the carapace in the adult male, it is deflexed, and constricted between the bases of the eye-peduncles as in *Macrophthalmus*. The epistoma is linear-transverse. The

endostome is without distinct longitudinal ridges; these are only very faintly indicated in their basal portion. The post-abdomen in the male is distinctly seven-jointed and resembles that of *Gonoplax*, but is distally rather broader; as in that genus, the two basal segments occupy the whole of the interspace between the bases of the ambulatory legs. The eye-pedicels are slender and greatly elongated, reaching the extremities of the antero-lateral angles of the carapace or even prolonged slightly beyond them. The antennules are transversely plicated. The antennæ occupy the narrow interior hiatus of the orbits; the basal joints are very short and do not nearly reach the lateral angles of the front; the flagella are moderately elongated. The ischium-joint of the exterior maxillipedes is not produced at its antero-internal angle; the merus is short, distally truncated, with the antero-external angles rounded. The chelipedes (in the adult males) are subequal and very greatly developed, sometimes exceeding in length three and a half times the greatest width of the carapace; the merus is subcylindrical and projects far beyond the antero-lateral angles of the carapace; the carpus is short and unarmed; palm slightly compressed, and nearly as long as the merus; fingers enclosing a wide basal interspace, compressed, distally acute, and irregularly dentated on the anterior margins. The ambulatory legs are elongated and compressed, without spines, and the dactyli are styliform and about as long as the penultimate joints.

Perhaps the nearest ally of this genus is *Gonoplax*, which *Ommatocarcinus* resembles in general form, in the great development of the chelipedes, in that the abdomen covers the whole width of the sternum at the base, and especially in the articulation of the fourth joint of the exterior maxillipedes with the merus at or near the antero-internal angle of the latter joint. *Ommatocarcinus* is distinguished from *Gonoplax* by the narrower front, the greater development of the eye-peduncles, and the greatly developed antero-lateral spine of the carapace.

I believe the only described species of this genus is the following:—

Ommatocarcinus macgillivrayi, White.

Ommatocarcinus macgillivrayi, White, Append. in Stanley, Voy. of the "Rattlesnake," vol. ii. p. 393, pl. v. fig. 1, 1852.
Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 163, 1852.

Queen Charlotte Sound, near Long Island, New Zealand, 10 fathoms, Station 167A (a young male and two small but ova-bearing females).

The smallest female has the following dimensions:—

♀.	Lines.	Millims.
Length of carapace, a little over	4	9
Breadth of carapace (to base of the spines at the antero-lateral angles), .	7	15

In all these specimens the chelipedes are of moderate length, not greatly elongated, as in the large Australian males, the types of the species, in the British (Natural History) Museum; the front, in the females especially, is somewhat broader, and the chelipedes relatively much shorter, with the merus-joints angulated, and armed with two or three spinules on the anterior margin, near the distal extremity, besides the spinule on the middle of the posterior margin, which is found also in the large adult males. These differences will perhaps be found to be of specific importance.

The largest female measures as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace,	5	10·5
Breadth to base of antero-lateral spine,	9	19
Length of a chelipede,	10	21

Macrophthalminæ.

Macrophthalmus, Latreille.

Macrophthalmus, Latreille, in Cuvier, Règne Animal, ed. 2, vol. iv. p. 44, 1829.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 63, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 155, 1852.

Carapace usually quadrate, depressed and broadly transverse, with the cervical and cardiaco-branchial sutures distinct on the lateral margins, nearly straight, and armed with one or more teeth behind that at the exterior angle of the orbit; front very narrow and deflexed, so as in great measure to conceal the antennules, and distally truncated. The orbits are very large and occupy the whole width of the anterior face of the carapace, between its antero-lateral angles and the front, and they are not defined externally, beneath the antero-lateral or exterior orbital angle. The epistoma is very narrow, usually linear-transverse. The longitudinal ridges of the endostome or palate are either absent or very obscurely indicated. The post-abdomen (in the male) is distinctly seven-jointed, and does not occupy the whole width of the sternum, between the bases of the fifth ambulatory legs. The ocular pedicels are slender and considerably elongated, and in certain species are even prolonged laterally beyond the exterior angle of the orbit. The antennules are transversely plicated. The antennæ are not excluded from the orbital hiatus, their basal portion is very short; the basal joint is usually transverse and does not nearly reach the frontal margin; the flagellum is somewhat elongated. The exterior maxillipedes do not meet along their inner margins; the ischium and merus-joints of the endognathi are distally truncated, or their anterior margins are even slightly concave; the carpus is articulated with the merus at its antero-external angle. The chelipedes (in the adult males) are usually subequal and somewhat elongated, with the merus trigonous; carpus without or with only a small spine on the interior margin; palm elongated, compressed, and rounded or subcarinated on the superior margin; fingers compressed and minutely denticulated on the interior margins, and usually

armed with one or two larger lobes or teeth, and distally acute or somewhat excavated. Ambulatory legs somewhat elongated, robust, with the merus-joints compressed, and usually armed with a subdistal spine on the superior margin; dactyli slender, nearly straight, and styliform.

The described species of this genus are numerous and occur in the littoral or shallow waters of all parts of the Indo-Pacific region.

The following are recent forms which have been described since the publication of Milne Edwards's memoir in 1852. They apparently all belong to his second section (§ 2) of the genus.

Macrophthalmus dentatus, Stimpson. Hong Kong.
Macrophthalmus convexus, Stimpson. Loo-Choo.
Macrophthalmus bicarinatus, Heller. Nicobars.
Macrophthalmus grandidieri, A. Milne Edwards. Zanzibar.
Macrophthalmus inermis, A. Milne Edwards. Sandwich Islands; New Caledonia.
Macrophthalmus lævis, A. Milne Edwards. Indian Ocean.
Macrophthalmus græffei, A. Milne Edwards. Upolu, Samoan Islands.
Macrophthalmus quadratus, A. Milne Edwards. New Caledonia.
Macrophthalmus punctulatus, Miers. New South Wales, Port Jackson.
Macrophthalmus latifrons, Haswell. Victoria, Port Philip.[1]

Macrophthalmus podophthalmus, Eydoux and Souleyet.

Macrophthalmus podophthalmus, Eydoux and Souleyet, Crust. in Voy. d. "Bonite," Zool., vol. i. pl. iii. fig. 6, 1841.
Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 155, 1852.

Torres Strait, August 1874 (a small male).

A young female of very small size from the Arafura Sea (depth not stated), may perhaps be regarded as the young of this species, although in the length of the ambulatory legs it approaches *Macrophthalmus sulcatus*, as described by Milne Edwards,[2] from the Mauritius. In this specimen the ocular peduncles project beyond the antero-lateral angles of the carapace by little more than the length of their corneæ; the carapace is less widely transverse than in the adult *Macrophthalmus podophthalmus*,

[1] *Macrophthalmus brevis* (Herbst), from the Red Sea and Zanzibar, which Milne Edwards and Hilgendorf placed (the former doubtfully) as synonymous with *Macrophthalmus carinimanus*, Latreille, is regarded by M. de Man (Notes Leyden Mus., vol. ii. p. 70, 1879) as distinct from that species; *Macrophthalmus polleni*, Hoffmann, from Sakatia Island, is thought by the same author to be synonymous with *Macrophthalmus latreillei*, Desmarest, which has been recorded both as a recent and fossil species.

[2] *Tom. cit.*, p. 156, 1852.

and the transverse sulci of the carapace are not more deeply indicated than in that species. The ambulatory legs are relatively more elongated and very slender (one only remains perfect, and is detached in this specimen). Its dimensions are as follows:—

Young ♀.	Lines.	Millims.
Length of carapace, nearly	2	4
Breadth of carapace,	2½	5·5

Macrophthalmus serratus, Adams and White (Pl. XX. fig. 1).

Macrophthalmus serratus, Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 51, 1848.
„ „ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 159, 1852.

Japan, Kobé, 8 to 10 fathoms (a small male and female).

These specimens are referred with much doubt to this species, on account of their very small size. One of the chelipedes in the male is deficient. The carapace is more finely granulated than in adult examples of *Macrophthalmus serratus*, the front perhaps somewhat broader, and the antero-teeth much less prominent. As in adult specimens there are obscure indications of a fourth lateral marginal tooth. In the female the first lateral tooth is less prominent than the following. I have observed a similar variation in adult males.

The figure of the adult is from a male of large size in the collection of the British (Natural History) Museum. In an adult female, also from the Philippines, in the collection, the antero-lateral teeth are less prominent, and the small Challenger specimens in these particulars more nearly approach this example.

Hemiplax, Heller.

Hemiplax, Heller, Crust. in Reise der "Novara," p. 40, 1865.
„ Miers, Cat. New Zeal. Crust., p. 33, 1876.

This genus was established by Dr. Heller for a species very nearly allied to *Macrophthalmus*, but differing from the typical species of that genus in the less transverse carapace and broader front, which is at least one-third of the width of the carapace at the antero-lateral angles. In all other characters it nearly resembles *Macrophthalmus*. As in that genus the exterior maxillipedes do not meet along the inner margins, and their merus-joints are short, distally truncated, and are not, as in *Metaplax* (to which *Hemiplax* is also very nearly related), traversed externally by an oblique piliferous crest. The chelipedes (as in *Macrophthalmus*) are subequal, and shorter than the ambulatory legs, and the fingers are finely denticulated on the inner margins.

I think that this genus would perhaps be better regarded as a subgenus of *Macrophthalmus*, and might perhaps include those forms (*Macrophthalmus quadratus*, A. Milne Edwards, *Macrophthalmus punctulatus*, Miers, &c.) which differ from the typical *Macrophthalmi* in their narrower carapace and broader front, and from *Euplax* in that the eye-peduncles reach, or nearly reach, the antero-lateral angles of the carapace.

Hemiplax hirtipes, Heller.

Metaplax hirtipes, Heller, Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, vol. xii. p. 521, 1862.
Hemiplax hirtipes, Heller, Crust. in Reise der "Novara," p. 40, pl. iv. fig. 3, 1865.
„ „ Miers, Cat. New Zeal. Crust., p. 34, 1876.

New Zealand, Queen Charlotte Sound, 10 fathoms (Station 167A). Five small specimens, males and females.

The chelipedes and ambulatory legs are more slender than in the fully grown adult, the carapace perhaps narrower, and the ambulatory legs less hairy. The largest male measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace, about	3	6·5
Breadth of carapace, about	4	8·5

Euplax, Milne Edwards.

Euplax, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xviii. p. 160, 1852.
„ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 281, 1873.
Chænostoma, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 97, 1858, subgenus (?).

This genus was established by Milne Edwards for two species which very nearly approach *Macrophthalmus* in all structural characteristics, and are distinguished merely by the shorter eye-peduncles, which do not nearly reach the exterior orbital angle (which is less developed than in the typical *Macrophthalmi*); the carapace is narrower than in the typical forms of *Macrophthalmus* and is uniformly granulated, and the front broader in width, nearly equalling the length of the eye-peduncles. It is very nearly connected with *Macrophthalmus*, through such forms as *Macrophthalmus quadratus*, A. Milne Edwards, and *Macrophthalmus punctulatus*, Miers.

Of the two species assigned by Milne Edwards to this genus, one, *Euplax boscii*, is distributed throughout the Indo-Pacific region, the other, *Euplax leptophthalmus*, Milne Edwards, occurs on the coast of Chili.

Euplax (*Chænostoma*) *boscii* (Audouin).

Macrophthalmus boscii, Audouin, Explic. des planches in Savigny, Crust. de l'Egypte, pl. ii. fig. 1.
Euplax boscii, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 160, 1852.
„ (*Chænostoma*) *boscii*, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 281, 1873, and reference to synonyma.
Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," pp. 238, 542, 1884.

Fiji Islands, Kandavu, July 1874 (an adult female, bearing ova).

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	5	10·5
Breadth of carapace, nearly	6	12·5

Family III. GRAPSIDÆ.

Grapsoidiens, Milne Edwards, Hist. Nat. Crust. vol. ii. p. 68, 1837.
Grapsidæ, Dana, U.S. Explor. Exped., vol. xiii., Crust., p. 329, 1852.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 187, 1880.
Grapsinæ (pt.), Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 163, 1853.

Carapace depressed or moderately convex, more or less quadrilateral, with the lateral margins straight or slightly arcuated. Front usually broad, more rarely of moderate width, never very narrow. Orbits and eye-peduncles of moderate size. The post-abdomen usually covers the whole width of the sternum at the base, between the coxæ of the fifth ambulatory legs. The carpal joint of the endognath of the exterior maxillipedes articulates at the summit or at the antero-external angle of the merus, not at the antero-internal angle. The chelipedes (in the adult males) are usually subequal and are moderately developed. The dactyli of the ambulatory legs are styliform, compressed, and are sometimes smooth, sometimes armed with strong spines.

The species are nearly always littoral or shallow-water forms, but rarely inhabit deep water (*e.g.*, *Euchirograpsus*). Both genera and species have been recently enumerated by Kingsley in the memoir cited above.

Subfamily 1. GRAPSINÆ.

Grapsinæ, Kingsley, *tom. cit.*, p. 189.

Antennules more or less transverse and covered by the front, which is entire, not longitudinally cleft.

This subfamily is divided by Mr. Kingsley (after Dana) into the following sections (or tribes) :—

1. Grapsini.

Grapsinæ, Dana, *tom. cit.*, p. 331.

Exterior maxillipedes without an oblique piliferous crest on the ischial and meral joints.

2. Sesarmini.

Sesarminæ, Dana, *tom. cit.*, p. 333.

Merus and ischium of the exterior maxillipedes crossed obliquely by a piliferous ridge.

Nautilograpsus, Milne Edwards.

Nautilograpsus, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 89, 1837; Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 173, 1853.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 201, 1880.
Planes (Leach, MS.), Bowdich, Excursion to Madeira and Porto Santo, p. 15, fig. 2, 1825 (description insufficient).

Carapace subquadrate, with the postero-lateral margins somewhat convergent, dorsally smooth and slightly convex, and usually with a slightly indicated lateral post-orbital tooth. The front is broad, usually about half the width of the carapace; its anterior margin projecting slightly and nearly straight. The orbits are small, and the margins entire or with only a very small notch beneath the eye-peduncles, near the exterior orbital tooth. The epistoma is short and broadly transverse. The longitudinal ridges of the endostome are distinct and well-defined. The post-abdomen in the male is distinctly seven-jointed, and its basal segments occupy the whole width of the sternum, between the coxæ of the ambulatory legs. The eye-peduncles are short and thick. The antennules are transversely plicated. The basal joint of the antennæ is short and robust, and is produced at its antero-external angle, which forms a lobe or tooth, and lies within the interior hiatus of the orbit; the flagellum is short. The exterior maxillipedes have a rhomboidal gape; the merus-joints are distally truncated, and their anterior margins are even slightly concave; the carpal joints are articulated near the rounded antero-external angles of the merus-joints. The chelipedes (in the adult males) are rather robust, subequal, of moderate size; the merus-joints trigonous, and the anterior margins dentated; carpi with a tooth or spine on the interior margins, palms somewhat turgid, rounded above; fingers dentated on the interior margins and distally acute. The ambulatory legs are short, with the joints compressed, and (the merus-joints especially) somewhat dilated; the penultimate joints are ciliated on the superior margins, and the inferior margins are spinuliferous; dactyli short, compressed and spinuliferous.

Nautilograpsus is allied in some particulars to *Trapezia* in the Cancroidea, and to *Litocheira*, Kinahan, in the Carcinoplacidæ, from both of which it is distinguished by the broader basal antennal joint and the compressed and robust ambulatory legs.

There is probably but a single species of this genus (the common Gulf-Weed Crab), which occurs nearly everywhere on floating weed in the temperate and tropical seas of the globe, and has been referred to under many different specific names.

Nautilograpsus minutus (Linné).

Cancer minutus, Linné, Syst. Nat., ed. xii., p. 1040, 1766.
Grapsus pusillus, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 32, 59, pl. xvi. fig. 2, 1835.
Nautilograpsus minutus, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 90, 1837; Ann. d. Sci. Nat., *tom. cit.*, p. 174, 1853.
„ „ Kingsley, *tom. cit.*, p. 202, 1880, et synonyma.

The specimens in the collection are from the following localities :—

Gomera, Canary Islands, February 1, 1873 (an adult male); between Bermuda and the Azores, June 20, 1873 (a large series of specimens, attached to *Ianthina* and other floating objects); off Sombrero Island, West Indies, March 15, 1873 (a small female); gulf-weed in the North-West Atlantic, April 1873 (numerous specimens); from *Fucus* in the North Atlantic, June 26, 1873 (an adult male and two females); South Pacific, near the Kermadec Islands, on the surface, among seaweed, July 15, 1874 (numerous specimens); North Pacific, off Volcano Island, April 4, 1875, from tube containing surface dredgings (a female); coast of Japan, June 1875 (an adult female); North-West Pacific, surface, June 1875 (two adult females).

Specimens of this genus show a considerable degree of variation in the convexity of the carapace, the development of the antero-lateral marginal tooth, which is sometimes obsolete, in the coloration of the body and limbs, &c., but I cannot find any valid characters for the distinction of the numerous supposed species which have been described by authors.

Adult ♂.	Lines.	Millims.
Length and breadth of carapace,[1]	9	19

Grapsus, Lamarck.

Grapsus, Lamarck (pt.), Syst. Anim. sans Vert., v. p. 247, 1818.
„ Milne Edwards (pt.), Hist. Nat. Crust., vol. ii. p. 83, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 166, 1853.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 192, 1880.

Carapace depressed, with the cervical sutures strongly defined; the lateral margins regularly arcuated, and armed with a single tooth behind the exterior orbital angle, the dorsal surface marked with transverse raised lines, which are strongest on the branchial regions; the front is of moderate width, strongly deflexed, and its anterior margin is entire and slightly arcuated; the orbits of moderate size, rather deep, and their inferior

[1] This is rather more than the average size of adult examples, but I have examined yet larger specimens in the collection of the British (Natural History) Museum.

margins have a fissure or notch, near the exterior orbital tooth; the epistoma is transverse and rather large; the buccal cavity small, and the ridges of the endostome or palate distinctly defined. The post-abdomen (in the male) is distinctly seven-jointed, and its basal segments cover the whole width of the sternum between the bases of the fifth ambulatory legs. The eye-peduncles are robust and short; the antennules are transversely plicated in very narrow fossetts. The basal antennal joint is very short and is produced at its antero-external angle; it lies within the interior orbital hiatus, between the front and the interior subocular lobe of the orbit, which is dentiform and acute; the flagellum is short. The exterior maxillipedes have a rhomboidal gape, and their endognathi are narrow (the ischium-joints are not in contact at the base); the merus-joints are truncated or slightly concave at the distal extremity, the carpi are articulated at the distal extremity of the merus-joints near the antero-external angle.

The chelipedes (in the adult male) are robust and rather short; merus-joints trigonous, with the anterior margins dentated; carpus with a strong lobe or tooth on the inner margin; palm short, granulated above; dactyli denticulated on the inner margin and excavated at the distal extremity. Ambulatory legs large and robust, with the merus-joints dilated and compressed; dactyli strongly spinulose.

There are probably but two distinct species of this long-known genus, to one or other of which many of the forms briefly characterised by M. H. Milne Edwards and other authors are to be referred as synonymous, or at most, as varieties.

Grapsus maculatus (Catesby). Common on all the warmer temperate and tropical coasts and islands both of the Indo-Pacific and Atlantic regions.

Grapsus trigosus (Herbst). Common on the shores and islands of the Indo-Pacific region.[1]

Grapsus maculatus (Catesby).

Pagurus maculatus, Catesby, Nat. Hist. of the Carolinas, vol. ii. p. 36, pl. xxxvi. fig. 1, 1743 and 1771.
Cancer grapsus, Linné, Syst. Nat., ed. xii., p. 1048, 1766.
Grapsus pictus, Latreille, Hist. Nat. Crust. et Ins., vol. vi. p. 69, pl. xlvii. fig. 2, 1803–1804.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 86, 1837; Crust. in Cuvier, Règne Animal, ed. 3, pl. xxii. fig. 1.
„ *maculatus*, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 167, pl. vi. fig. 1, 1853.
„ „ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 192, 1880, et synonyma (?).
„ *pictus*, var. *ocellatus*, Studer, Abhandl. d. k. Akad. d. Wiss. Berlin, Abh. ii., p. 14, 1882.

Of this common and widely distributed species, specimens are in the collection from the following localities:—Bermuda, an adult male (in spirits), and an adult male and

[1] *Grapsus gracilipes*, Milne Edwards, is retained as distinct by Kingsley, but is regarded by M. de Man as a variety of *Grapsus maculatus*. *Grapsus simplex*, Herklots, referred to by de Man, may be a distinct species.

female in imperfect condition (preserved dry); St. Paul's Rocks, August 1873 (a good series of specimens); St. Michael's, Fernando Noronha, on the rocks, September 1873 (two males and two females); Ascension Island, on the shore (a small male); and St. Vincent, Cape Verde Islands, July 1873 (two females and two young males).

Grapsus maculatus, as has been repeatedly observed, varies much in the coloration of the carapace and limbs. The specimens in the Challenger series from Bermuda and St. Paul's Rocks, which are the largest and best preserved in the collection, nearly resemble in colour the excellent figure given by M. H. Milne Edwards in the large illustrated edition of the Règne Animal de Cuvier, which is reproduced, uncoloured, in his monograph of the group in the Ann. d. Sci. Nat. (*tom. cit.*), and which may, I presume, be regarded as typical of the species. To this (the typical) variety also probably belong the specimens from Fernando Noronha and Ascension Island.

The specimens from the Cape Verde Islands are perhaps referable to the variety described by M. Milne Edwards as *Grapsus webbi*, in which the spots of the carapace are smaller and more numerous, but the two are connected by imperceptible gradations.

The variety designated by Studer, *Grapsus pictus*, var. *ocellatus*, ought not to be separated, I think, from the typical form.

Adult ♂.	Lines.	Millims.
Length of carapace, about	30	63·5
Breadth of carapace,	33	70

Grapsus strigosus (Herbst).

Cancer strigosus, Herbst, Naturgesch. der Krabben u. Krebse, vol. iii. Heft 1, p. 55, pl. xlvii. fig. 7, 1799.
Goniopsis flavipes, MacLeay, in Smith, Illustr. Zool., South Africa, p. 66, 1838.
Grapsus strigosus, Latreille, Hist. Nat. Crust. et Ins., vol. vi. p. 70, 1803–1804.
" " Milne Edwards, Hist. Nat. Crust., vol. ii. p. 87, 1837; Ann. d. Sci. Nat., *tom. cit.*, p. 169, 1853.
" " A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 286, 1873.
" " Kingsley, Proc. Acad. Nat. Sci. Philad., p. 194, 1880, et synonyma.

Arrou Islands (a small female).

The front is transversely wider and less abruptly deflexed; the postfrontal lobes less prominent, and the epistoma is wider and shorter in this species than in *Grapsus maculatus*.

The Challenger specimen is a small one and faded, presenting but slight traces of the original coloration.

♀.	Lines.	Millims.
Length of carapace,	10	21
Breadth of carapace, about	10½	22·5

Leptograpsus, Milne Edwards.

Leptograpsus, Milne Edwards (pt.), Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 171, 1853.
„ Stimpson, Proc. Acad. Nat. Sci. Philad., p. 101, 1858.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 196, 1880.

This genus, as restricted by Stimpson and Mr. Kingsley, is very nearly allied to *Grapsus*, but distinguished as follows:—The front is nearly horizontal, but very slightly deflexed, and the postfrontal or protogastric lobes of the carapace are but very obscurely developed. There are two teeth behind the exterior orbital tooth on the lateral margins, which are arcuated as in *Grapsus*. The basal antennal joint is broader, and the lobe at the antero-external angle fully reaches the apex of the interior subocular lobe of the orbit, which is shorter than in *Grapsus;* the exterior maxillipedes (the merus-joints of the endognaths especially) are broader than in that genus.

I doubt the advisability of regarding *Leptograpsus* as a distinct genus; as restricted above, it will contain only the following species:—

Leptograpsus variegatus (Fabricius). Australian Coasts; Norfolk Island; New Zealand; Marianne Islands; Shanghai; Chili; St. Ambrose Islands; Juan Fernandez; Pernambuco; and perhaps the Canary Islands (Milne Edwards, as *Leptograpsus bertheloti*).[1]

Leptograpsus variegatus (Fabricius).

Cancer variegatus, Fabricius, Entom. Syst. Suppl., vol. 2, p. 450, 1793.
Grapsus variegatus, Latreille, Hist. Nat. Crust. et Ins., vol. vi. p. 71, 1803–1804.
„ „ Guérin, Icon. du Règne Animal, Crust., pl. vi. fig. 1.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 87, 1837.
Leptograpsus variegatus, Milne Edwards, Ann. d. Sci. Nat., *tom. cit.*, p. 171, 1853.
„ „ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 196, 1880, et synonyma (?).

Valparaiso, on the shore (an adult female).

Adult ♀.	Lines.	Millims.
Length of carapace,	19½	41
Breadth of carapace,	22	46·5

Metopograpsus, Milne Edwards.

Metopograpsus, Milne Edwards (§ 1), Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 164, 1853.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 190, 1880.

Carapace depressed, subtrapezoidal, broader than long, with the antero-lateral margins straight or nearly straight, entire or unidentated, and slightly convergent to the posterior

[1] *Grapsus inornatus*, Hess, from Sydney, may belong to this genus, but, on account of the long curved dactyli, I think it more probably belongs to *Cyrtograpsus* or *Pseudograpsus*.

margins. The dorsal surface plicated only on the lateral margins. Front very broad, deflexed, with the anterior margin straight or slightly sinuated. Orbits small, with the interior subocular lobe usually very broad, reaching the front, and completely excluding the antennæ from the orbit. Epistoma very short, almost linear-transverse. Endostome with the longitudinal ridges usually (but not invariably) distinctly developed. Post-abdomen (in the male) distinctly seven-jointed, and covering the whole width of the sternum at the base. Eye-peduncles short, robust. Antennules transversely plicated in short, wide fossettes. Antennæ with the basal joint very short, completely excluded from the orbit, and more or less produced at its antero-external angle; flagellum short. Exterior maxillipedes with a rhomboidal gape; the merus-joints short, and broader than in *Grapsus*, distally truncated, and bearing the next joint at their summits, near the antero-external angle. Chelipedes subequal, and moderately developed, with the merus-joints trigonous and their anterior margins distally dentated; palms somewhat turgid, rounded above and below; fingers excavated at the distal extremity. Ambulatory legs of moderate length, with the merus-joints dilated and compressed, their anterior margins with a subterminal spine, and their posterior margins with several spines at the distal extremity; the dactyli rather short and spinuliferous.

This genus is distinguished from *Pachygrapsus*, its nearest ally, by the less convex carapace, which is usually less distinctly plicated on the dorsal surface, and by the great development of the interior subocular lobe of the orbit. The species, which with their synonyms have been enumerated by Mr. Kingsley, are apparently confined to the Indo-Pacific region.

Metopograpsus messor (Forskål).

Cancer messor, Forskål, Descript. animalium quæ in itinere orientali observavit, P. Forskål, p. 88, 1775.
Grapsus gaimardii, Audouin, Explic. des planches in Savigny, Descr. de l'Egypte, Crust. Atlas, pl. ii. fig. 3.
„ *messor*, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 88, 1837.
Metopograpsus messor, Milne Edwards, Ann. d. Sci. Nat., *tom. cit.*, p. 165, 1853.
„ „ Kingsley, *tom. cit.*, p. 190, 1880, and references to synonyma.
Grapsus (*Pachygrapsus*) *æthiopicus*, Hilgendorf, Crust. in Van der Decken, Reise in Ost-Afrika, vol. iii. p. 88, pl. iv. fig. 2, 1869; *teste*, Hilgendorf, Monatsber. d. k. preuss. Akad. d. Wiss. Berlin, p. 808, 1878.

Metopograpsus messor, var. *frontalis*, Miers.

Metopograpsus messor, var. *frontalis*, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. v. p. 311, 1880.

Kandavu, Fiji (a small male); Tahiti, near the reefs (two males and two females); Papiete, Tahiti, in brackish water at the mouth of a stream (several specimens, mostly females); Sandwich Islands, Hilo, on the beach (several males and females).

The specimens collected show considerable variation in the coloration and markings of the carapace.

Adult ♂.	Lines.	Millims.
Length of carapace, about	10½	22·5
Breadth of carapace, nearly	13	27

Pachygrapsus, Randall.

Pachygrapsus, Randall, Journ. Acad. Nat. Sci. Philad., vol. viii. p. 126, 1839.
„ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 166, 1853.
„ Kingsley (pt.), Proc. Acad. Nat. Sci. Philad., p. 198, 1880.

This genus in all of its characters is very nearly allied to *Metopograpsus*, but is distinguished by the somewhat more convex carapace, which is usually very distinctly plicated over the whole of the dorsal surface, and by the lesser development of the interior subocular lobe of the orbit, which does not reach the front, so that the produced antero-external lobe of the basal antennal joint usually enters slightly within the orbital hiatus.

The species are widely distributed over the warmer, temperate, and tropical shores and islands, both of the Indo-Pacific and Atlantic regions. The single species occurring in the Challenger collection has (as the specimens collected show) a very extended geographical range. For further details upon the distribution of this genus I may refer to Mr. Kingsley's memoir.[1]

Pachygrapsus transversus, Gibbes.

Pachygrapsus transversus, Gibbes, Proc. Amer. Assoc. Adv. Sci., p. 181, 1850.
„ „ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 199, 1880, where references to synonyma.
Goniograpsus innotatus, Dana, Proc. Acad. Nat. Sci. Philad., p. 249, 1851; U.S. Explor. Exped., vol. xiii., Crust., p. 345, pl. xxi. fig. 9, 1852.

Bermuda, on the shore (an adult male and two females); St. Vincent, Cape Verde Islands, July 1873 (four males, of which two are adult, and a young female); Australia, Port Jackson, Sow and Pig's Bank, in 6 fathoms (an adult male).

I can see no distinctions of specific importance in the specimens from these widely-distant localities.[2]

[1] I would suggest here, that the genus *Goniograpsus*, Dana, which is not retained as distinct either by Stimpson or Kingsley, may be conveniently restricted to and used as a generic designation for the Mediterranean *Pachygrapsus marmoratus*, and (probably) the Chilian *Pachygrapsus pubescens*, Heller, and *Pachygrapsus latipes*, in which the carapace has two teeth behind the tooth at the exterior orbital angle. *Goniograpsus marmoratus*, which is the only one of these species I have examined, is further distinguished from the typical *Pachygrapsi* by the nearly horizontal front and smoother quadrate carapace.

[2] It is very probable that this species may be identical with the earlier described *Pachygrapsus maurus* (Lucas), from the Mediterranean, but as I have examined no Mediterranean examples of the genus, I do not venture to unite the two forms. Of the numerous synonymical citations admitted by Kingsley, there are one or two which I have not personally verified.

An adult male from Port Jackson measures :—

Adult ♂.	Lines.	Millims.
Length of carapace,	6	13
Breadth of carapace, nearly,	8½	17·5

Geograpsus, Stimpson.

Geograpsus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 101, 1858.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 195, 1880.
Discoplax, A. Milne Edwards, Ann. Soc. Entom. France, ser. 4, vol. vii. p. 284, 1867; Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 293, 1873.
Orthograpsus, Kingsley, Proc. Acad. Nat. Sci. Philad, p. 194, 1880.

This genus is allied to *Leptograpsus* and to *Pachygrapsus*, but is distinguished from both by the form of the carapace, which is depressed, plicated only near the lateral margins, with the antero-lateral margins straight or arcuated only at the hepatic regions, posteriorly nearly straight; they are armed with a single tooth behind the exterior orbital tooth. Front of moderate width and deflexed. The orbits, epistoma, buccal cavity, post-abdomen, and eye-peduncles present nothing remarkable. The basal antennal joint is short and but slightly produced at its antero-external angle. As in *Grapsus*, the endognathi of the exterior maxillipedes are narrow; the merus-joints, in particular, slender and elongated, distally truncated, and bearing the next joint at or near the antero-external angle. The chelipedes and ambulatory legs resemble those of *Leptograpsus* and *Pachygrapsus*, but the fingers of the palms of the chelipedes are acute or subacute, not excavated at the distal extremities.

The species occur both in the Indo-Pacific and Atlantic regions, and are all, I believe, littoral or shallow-water forms.

The genus *Discoplax* is united by Kingsley with *Geograpsus*, but may prove to be distinct in the figure of the type (*Discoplax longipes*, A. Milne Edwards), the carapace is represented as strongly arcuated and granulated anteriorly, and the merus of the exterior maxillipedes is shorter and broader than in the typical *Geograpsi*.

The species of *Geograpsus* as restricted above are :—

Geograpsus lividus, Milne Edwards (=*Geograpsus brevipes*, Milne Edwards; *Geograpsus occidentalis*, Stimpson). West Indies; California; Chili.

Geograpsus crinipes, Dana (=*Geograpsus depressus*, Heller, *fide* Kingsley). Polynesian Islands.

Geograpsus longitarsis (Dana). Paumotu Archipelago.

Geograpsus grayi, Milne Edwards (=*Geograpsus rubidus*, Stimpson). Indo-Pacific Region.

Geograpsus eydouxi (Milne Edwards). Chili. (This species is regarded by Kingsley as identical with *Pachygrapsus crassipes*, Randall, but I believe its true place to be in the genus *Geograpsus*, since Milne Edwards says of the chelipedes "*pinces aigües.*")

Geograpsus (?) *longipes* (A. Milne Edwards). New Caledonia.

Geograpsus hillii (Kingsley). West Indies; Florida.

Geograpsus grayi[1] (Milne Edwards).

Grapsus grayi, Milne Edwards, Ann. d. Sci. Nat., *tom. cit.*, p. 170, 1853.
Geograpsus grayi, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 288, pl. xvi. fig. 1, 1873.
,, ,, Kingsley, Proc. Acad. Nat. Sci. Philad., p. 196, 1880, et synonyma.

Fiji Islands, Kandavu (two small males).

♂.	Lines.	Millims.
Length of carapace, about	7	15
Breadth of carapace, about	8	17

Pseudograpsus, Milne Edwards.

Pseudograpsus (pt.), Milne Edwards, Hist. Nat. Crust., vol. ii. p. 81, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 191, 1853.
,, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. iv. p. 176, 1868.
,, Kingsley, Proc. Acad. Nat. Sci. Philad., p. 204, 1880.

Carapace subquadrate, depressed or nearly flat on the dorsal surface, with the antero-lateral margins arcuated and dentated; the branchial regions not defined as in *Varuna*; in the middle of the carapace is an H-shaped impression formed by part of the cervical and cardiaco-branchial sutures; the epigrastic lobes are well-defined; the front is but slightly deflexed, and its anterior margin is sinuated or nearly straight. Orbits small, with the interior subocular lobe acute or subacute. Epistoma very short and widely transverse. Buccal cavity large; the ridges of the endostome or palate not very distinct. Post-abdomen of the male distinctly seven-jointed; the basal segments do not cover the whole width of the sternum, between the coxæ of the fifth ambulatory legs. Eye-peduncles short. Antennules transversely plicated. Antennæ with the basal joint short and not markedly dilated at the antero-external angle, it sometimes does not reach the infero-lateral frontal process. Exterior maxillipedes with the exognath much dilated, as broad or nearly as broad as the ischium of the endognath; the merus of the endognath

[1] It is possible, as Mr. Kingsley has pointed out, that the species described by Dana as *Grapsus crinipes* is identical with *Geograpsus grayi*, and if so, his name having priority, must be used for the species, but I prefer to refer to it for the present under the designation which has been more generally adopted for it, since Dana's description is somewhat insufficient, and may belong to a species of *Pachygrapsus*.

is much enlarged, with the antero-external angle much produced and rounded; the next joint is articulated at or near the middle of the distal margin of the merus. The chelipedes (in the male) are often considerably developed; the merus is trigonous; carpus without a spine on its interior margin; palm sometimes compressed but not flattened or concave, on the exterior surface, and usually with a lanate patch of hair on the exterior surface at the base of the fingers, which are distally acute or subacute. Ambulatory legs with the joints not dilated; dactyli styliform, without marginal spines.

Thus characterised the genus *Pseudograpsus* is nearly allied to *Varuna* (see below), and to a genus represented by two or three species in the collection of the British (Natural History) Museum, which I identify, somewhat doubtfully, with *Ptychognathus*, Stimpson (*Gnathograpsus*, A. Milne Edwards), and which is distinguished from *Pseudograpsus* by the flatter carapace, with nearly horizontal front, and without distinct epigrastic lobes, and the enormous development of the exognathi of the exterior maxillipedes. Another genus, represented by a single species from the Fiji Islands and New Hebrides in the collection of the museum, which I will designate *Macrograpsus*, is characterised by the form of the palms and dactyli of the chelipedes in the male, which are greatly dilated and flattened on their exterior surfaces. The species may be designated *Macrograpsus orientalis*. The species of *Pseudograpsus* have been enumerated by Mr. Kingsley.[1]

The genera *Cælochirus*, Nauck, and *Pachystomum*, Nauck (Zeitschr. f. wiss. Zool., vol. xxxiv. pp. 66, 67, 1880), based on types from the Philippines, and which are allied to *Pseudograpsus*, are too briefly described for certain identification with any of the above-mentioned genera.

Pseudograpsus albus, Stimpson.

Pseudograpsus albus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 104, 1858.
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. ix. p. 314, pl. xviii. fig. 2, 1873.
„ „ Kingsley, *tom. cit.*, p. 205, 1880.

Kandavu, Fiji Islands, July 1874. (Two males).

In the specimens I refer to this species, the front curves slightly downwards, and the epigastric lobes are distinctly defined. The antero-lateral margins also are slightly arcuated.

♂.	Lines.	Millims.
Length of carapace, nearly	4½	9
Breadth of carapace, nearly	5	10

These characters are perhaps the best that can be cited to distinguish this genus from *Ptychognathus*, Stimpson (*Gnathograpsus*, A. Milne Edwards), since in the

[1] *Gnathograpsus pilipes*, A. Milne Edwards, is, for reasons I have indicated below, to be referred, I think, to the genus *Pseudograpsus*.

produced antero-external angle of the merus of the outer maxillipedes, and in the dilatation of their exognath, certain species of the former genus nearly approach *Ptychognathus*. If the genera be thus defined, *Gnathograpsus pilipes*, A. Milne Edwards, will be better placed in *Pseudograpsus* than in *Ptychognathus*, where both Kingsley and myself have placed it.

Platygrapsus, Stimpson.

Platynotus, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 34, pl. D., 1835; name previously used.
Platygrapsus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 104, 1858.

This genus is very nearly allied in external appearance and in nearly all structural points to *Pseudograpsus*, but is distinguished by the form of the exterior maxillipedes, whose ischium-joint is short, very obliquely, not squarely truncated at the distal extremity. The merus-joint is large, distally truncated, and the next joint articulates with it near its antero-external angle, which is not produced as in *Pseudograpsus;* the exognath also is narrower than in that genus. As in *Pseudograpsus*, the carapace is depressed, with the antero-lateral margins slightly arcuated and dentated; the epigastric lobes are developed; the post-abdomen of the male does not cover the whole width of the sternum at the base. The chelipedes are well developed, and the dactyli of the ambulatory legs are styliform and without marginal spines.

The single species, *Platygrapsus depressus*, occurs on the shores and islands of China and Japan.

Platygrapsus depressus (de Haan).

Platynotus depressus, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 34, 63, pl. viii. fig. 2, 1835.
" " Milne Edwards, Ann. d. Sci. Nat., *tom. cit.*, p. 199, 1853.
Platygrapsus depressus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 104, 1858.
" " Miers, Proc. Zool. Soc. Lond., p. 37, 1879.
" " Kingsley, *tom. cit.*, p. 211, 1880, et synonyma.

Japan, Kobé, 50 fathoms, lat. 34° 38′ 0″ N., long. 135° 1′ 0″ E., Station 233A. (A small female bearing ova).

♀.	Lines.	Millims.
Length of carapace,	3	6·5
Breadth of carapace,	3½	7

Brachynotus, de Haan.

Brachynotus, de Haan, Crust. in v. Siebold, Fauna Japonica, decas ii. p. 34, 1835.
„ Hilgendorf, Sitz. Gesellsch. Freunde zu Berlin, p. 68, 1882.
Heterograpsus, Lucas, Anim. articulés in Explor. Sci. de l'Algérie, vol. i. p. 18, 1849.
„ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 192, 1853.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 207, 1880, et synonyma.

This genus is very nearly allied to *Pseudograpsus*, but may be distinguished by the form of the exterior maxillipedes, whose merus-joint is not produced at its antero-external angle as in that genus; the exognath also is much narrower. As in *Pseudograpsus*, there are normally two teeth behind the orbital angle. From *Platygrapsus*, it is distinguished by the shorter merus-joint and the form of the ischium of the exterior maxillipedes, which is squarely, not obliquely truncated, at the distal extremity; *Cyrtograpsus*, Dana, has a differently shaped carapace, with normally three teeth behind the exterior orbital angle, a narrower front, and widely gaping maxillipedes.[1]

The species, which are enumerated by Kingsley, are distributed throughout the Indo-Pacific region, and one, *Brachynotus sexdentatus* occurs in the Mediterranean. To those he mentions, the following is to be added:—

Brachynotus longitarsis (Miers). Japanese and Corean Seas.

The Oriental forms (true *Heterograpsi*) may perhaps be still regarded as subgenerically distinct from the Mediterranean type of the genus *Brachynotus*, on account of their broader, more depressed carapace, which has a median dorsal H-shaped impression (which does not exist in *Brachynotus sexdentatus*, Risso), by the less prominent and less accentuated lateral marginal teeth, and by the more prominent front.[2]

Brachynotus (*Heterograpsus*) *penicillatus* (de Haan).

Eriocheir penicillatus, de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 32, 60, pl. xi. fig. 6, 1835.
Heterograpsus penicillatus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 104, 1858.
„ „ Kingsley, *tom. cit.*, p. 209, 1880.

Japan, Oosima, from pools (three adult males).

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	9	18·5
Breadth of carapace,	10	21

[1] The species with three antero-lateral marginal teeth, constituting Kingsley's Section B of the genus *Heterograpsus*, would perhaps be better referred to *Cyrtograpsus*.

[2] Dr. Hilgendorf (*tom. cit.*, p. 70) has proposed the name *Brachynotus edwardsii* for *Heterograpsus sexdentatus*, Milne Edwards, not Risso.

Varuna, Milne Edwards.

Varuna, Milne Edwards, Dict. Class. d'Hist. Nat., vol. xvi. p. 511, 1830; Hist. Nat. Crust., vol. ii. p. 94, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 176, 1853.
,, Kingsley, Proc. Acad. Nat. Sci. Philad., p. 205, 1880.
Trichopus, de Haan (subgenus), Crust. in v. Siebold, Fauna Japonica, decas ii. p. 32, 1835.

This genus is nearly allied to *Pseudograpsus*, but may be distinguished as follows:—The front and the antero-lateral teeth of the carapace are more prominent; the front nearly horizontal. The branchial regions of the carapace are laterally defined by a granulated line. The orbits are much deeper, and are widely open below. The exognath of the exterior maxillipedes (although rather broad) is much less developed. The chelipedes (in the male) are subequal and somewhat more slender; carpus with a spine on its interior surface. The fifth to the seventh joints of the ambulatory legs are ciliated, compressed, and somewhat dilated and adapted for swimming.

This genus contains but a single species, *Varuna litterata*, which occurs commonly throughout the Indo-Pacific region.

Varuna litterata (Fabricius).

Cancer litteratus, Fabricius, Entom. Syst. Suppl., p. 342, 1798.
Varuna litterata, Milne Edwards, Dict. Class. d'Hist. Nat., vol. xvi. p. 511, 1830; Hist. Nat. Crust., vol. ii. p. 95, pl. xiv. *bis*, fig. 8, 1837; Ann. d. Sci. Nat, *tom. cit.*, p. 176, 1853.
,, ,, Dana, U.S. Explor. Exped., vol. xiii., Crust., p. 336, pl. xx. fig. 8, 1852.
,, ,, Kingsley, *tom. cit.*, p. 205, 1880, and references to literature.

Philippines, Pasananca, Mindanao, in the rivers (a male); north coast of New Guinea (three males and three females); Banda, fresh water (a young male).

In these specimens the frontal margin is perfectly straight, and is less rounded at the lateral angles than is usual in the genus.

The colour (in spirit) is a deep chocolate-brown; on either side of the gastric region and in front of the branchial regions are three or four yellow spots.

	Lines.	Millims.
Length of carapace, nearly	21	44
Breadth of carapace, ...	23½	50

Epigrapsus, Heller.

Epigrapsus, Heller, Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, vol. xii. p. 522, 1862.
,, Kingsley, Proc. Acad. Nat. Sci. Philad., p. 192, 1880.
Nectograpsus, Heller, Crust. in Reise der "Novara," p. 56, 1865.

Carapace depressed, smooth and polished on the dorsal surface, nearly quadrate, with the antero-lateral angles rounded and entire. Front of moderate width, deflexed; no

postfrontal crest. Orbits small, the superior margin entire, the inferior margin scarcely defined, the interior subocular lobe small and dentiform; from the base of this lobe a raised line or crest extends beneath the orbits in a straight line continuous with the anterior margin of the epistoma nearly to the subhepatic regions. Epistoma transverse and very broad. Ridges of the endostome very indistinct. Post-abdomen in the male distinctly seven-jointed, the terminal segment narrower than the preceding; it covers the whole width of the sternum at the base. Eye-peduncles small. Antennules transversely plicated and partially concealed by the deflexed front. Antennæ very small; the basal joint short, quadrate, and occupying the interior orbital hiatus. Exterior maxillipedes rather short and broad, with a rhomboidal gape; the merus of the endognath oblique, nearly as large as the ischium, distally truncated, and bearing the next joint near its antero-external angle. Chelipedes (in the adult male) well developed; merus trigonous, unarmed; carpus without a spine on its interior surface; palm smooth, rounded above; fingers subacute. Ambulatory legs rather slender and smooth; dactyli styliform and spinulose.

The nearest ally to this genus is probably *Acmæopleura*, very briefly characterised by Stimpson, in which form, however, the orbits are nearly complete inferiorly, and the maxillipedes have not a rhomboidal gape.

The single described species of *Epigrapsus* (*Epigrapsus politus*) occurs at the Nicobars and various islands of the Polynesian group (New Hebrides, Fiji Islands, Tahiti).

Epigrapsus politus, Heller.

Epigrapsus politus, Heller, Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xii. p. 522, 1862.
„ „ Kingsley, *tom. cit.* p. 192, 1880.
Nectograpsus politus, Heller, Crust. in Reise der "Novara," p. 57, pl. v. fig. 3, 1865.

New Hebrides, Api (an adult male).

In this specimen, and in others from the Fiji Islands in the collection of the British (Natural History) Museum, the carapace is slightly broader in front and narrower behind than in the figure cited, and all the post-abdominal segments in the male are distinct.

Adult ♂.	Lines.	Millims.
Length of carapace,	6½	14
Greatest breadth of carapace,	8	17

Goniopsis, de Haan.

Goniopsis, de Haan (pt.), Crust. in v. Siebold, Fauna Japonica, decas ii. p. 33, 1835.
„ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool. xx. p. 164, 1853.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 189, 1880.

Carapace vertically thick, subquadrate, flat above, with the cervical suture strongly defined, the lateral margins armed with a single tooth behind the exterior orbital angle,

the anterior margin abruptly four-lobed above the front, which is broad and vertically deflexed. Orbits rather large, with two hiatuses below, and with the interior subocular lobe well-developed. Epistoma very short, transverse. The ridges of the endostome distinctly developed. Post-abdomen (in the male) rather broadly triangulate, distinctly seven-jointed, and occupying the whole width of the sternum at the base between the coxæ of the fifth ambulatory legs. Eye-peduncles short, robust. Antennules transversely plicated in the narrow, wide fossettes. Antennæ with the basal joint broad and very short; they are completely excluded from the orbit by the intervening subocular orbital lobe. Exterior maxillipedes narrow, widely gaping and remote from one another at the base (as in *Grapsus*); the merus of the endognath nearly as long as the ischium, widening to the distal extremity, which is truncated; the next joint articulated near the antero-external angle of the merus; exognath very slender. Chelipedes (in the adult male) robust; merus trigonous, with the anterior margin dentated; carpus and hand strongly granulated; palm somewhat compressed; fingers but slightly excavated or subacute. Ambulatory legs robust, with the merus-joints broadly dilated and compressed; penultimate joints spinuliferous and dactyli armed with strong spines.

The genus is somewhat intermediate between *Grapsus*, from which it is distinguished by the great development of the interior subocular lobe and form of the carapace, and *Sesarma*.

There are but two species :—*Goniopsis cruentatus*, whose synonyma and wide distribution are referred to by Kingsley and S. J. Smith, and *Goniopsis pulcher* (Lockington), which is apparently distinguished by the coloration, and occurs on the coasts of Lower California and Panama (Coll. Brit. Mus.).

Goniopsis cruentatus (Latreille).

Grapsus cruentatus, Latreille, Hist. Nat. Crust. et Ins., vol. vi. p. 70, 1803–1804.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 85, 1837.
Goniopsis cruentatus, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 33, 1835.
„ „ Milne Edwards, Ann. d. Sci. Nat., *tom. cit.*, p. 164, pl. vii. figs. 2, 2*a*, *b*, 1853.
„ „ Kingsley, *tom. cit.*, p. 190, 1880, et synonyma.
Goniograpsus cruentatus, Dana, U.S. Explor. Exped., vol. xiii., Crust., p. 342, pl. xxi. fig. 7, 1852.

Bermuda (a large series of specimens, males and females); some of these are labelled as from Hungry Bay, in the mangrove swamps.

Adult ♂.	Lines.	Millims.
Length of carapace,	18	40·5
Breadth of carapace,	22½	47·5

Helice, de Haan.

Helice, de Haan (subgenus), Crust. in v. Siebold, Fauna Japonica, decas ii. p. 28, 1835.
„ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 189, 1853.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 219, 1880.

Carapace dorsally thick and convex, transverse, quadrate, with the antero-lateral margins straight and dentated. Front of moderate width and curving downwards, but not abruptly deflexed; the anterior margin not projecting as in the genus or subgenus *Paragrapsus*. The orbits are large. The epistoma is transverse and very short. The endostomian ridges are distinctly defined. The post-abdomen in the male is distinctly seven-jointed, and at the base does not quite cover the whole width of the sternum between the bases of the fifth ambulatory legs. The eye-peduncles are rather short, and do not reach the antero-external angle of the orbit. The antennules are transversely plicated. The basal antennal joint is very small, and does not reach the extero-lateral angle of the front, and it lies within the interior hiatus of the orbit. The exterior maxillipedes have between them, when closed, a rhomboidal gape; the merus of the endognath is externally concave, as long or nearly as long as the ischium, and widens to the distal extremity, which is truncated or slightly concave; the following joint is articulated at or near the antero-external angle of the merus; the exognath is very narrow. The chelipedes (in the adult male) are subequal and moderately developed; merus trigonous; carpus angulated, but usually without a spine at the interior angle; palm rounded or subcarinated above, fingers subexcavated at the distal extremity. Ambulatory legs rather slender, with the merus-joints not markedly dilated; the dactyli slender, styliform, and unarmed.

This genus is very nearly allied to *Chasmagnathus*, de Haan, of which it should, perhaps, be considered a subgenus. It is scarcely distinguished from it by any constant character, except the nearly straight, not arcuated, antero-lateral margins of the carapace in the male. From *Paragrapsus*, Milne Edwards, which Mr. Kingsley unites with *Chasmagnathus*, it is further distinguished by the thicker body and the non-projecting anterior margin of the front.

Besides the species enumerated by Kingsley, the following should perhaps be referred to *Helice*:—

Helice (?) *longipes* (*Sesarma longipes*, Krauss). South Africa, Umlaas (? Umlazi) River.

Helice latreillei, Milne Edwards, var. (Pl. XXI. fig. 2).

Cyclograpsus latreillei, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 80, 1837.
Helice latreillei, Milne Edwards, Ann. d. Sci. Nat., *tom. cit.*, p. 190, 1852.
„ „ Kingsley, *tom. cit.*, p. 220, 1880.

Philippine Islands, Samboangan, 10 fathoms, on the reefs (a small male); Fiji Islands, Kandavu (an adult female).

In the specimens, referred somewhat doubtfully to this species,[1] the carapace and chelipedes are punctulated and the frontal and gastric regions marked with a median posteriorly bifurcating suture. In the larger (female) specimen there is no trace of the posterior (fourth) rudimentary tooth of the lateral margins, which is very faintly indicated on one side only in the smaller male. The female specimen has also a relatively somewhat broader carapace, with the sides anteriorly slightly arcuated, and the antero-lateral teeth less prominent, as in the species of *Chasmagnathus*, and may perhaps belong to a distinct species, on which account I think it useful to figure it. Its dimensions are as follows :—

Adult ♀.	Lines.	Millims.
Length of carapace,	6	12·5
Breadth of carapace, nearly	8	16·5

Helice crassa, Dana.

Helice crassa, Dana, Proc. Acad. Nat. Sci. Philad., p. 252, 1851; U.S. Explor. Exped., vol. xiii., Crust., p. 367, pl. xxiii. fig. 8, 1852.
„ „ Kingsley, *tom. cit.*, p. 220, 1880, et synonyma (?).

Port Jackson, Sow and Pig's Bank, 6 fathoms (a small male).

♂.	Lines.	Millims.
Length of carapace, nearly	4	8
Breadth of carapace,	4½	9

The carapace in this specimen, which is not fully grown, is flatter, and the body more depressed than is usual in the genus.

Sesarma, Say.

Sesarma, Say, Journ. Acad. Nat. Sci. Philad., vol. i. p. 76, 1817.
„ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 181, 1853.
„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 213, 1880, et synonyma.

Body thick. Carapace quadrate, and normally broader than long, with the sides straight, not arcuated, entire or dentated. Front rather broad, and abruptly deflexed, with the anterior margin straight or sinuated; the epigastric lobes prominent, and defined externally by a suture (except in the forms separated by Milne Edwards as *Holometopus*). Orbits large, with a hiatus below the exterior angle; the interior subocular lobe is moderately developed and does not exclude the antenna from the orbital cavity. Epistoma transverse and very short. Endostomian ridges usually distinctly developed. Post-abdomen (in the male) distinctly seven-jointed, and covering the whole width of the

[1] They agree closely with specimens from the Mauritius, whence were obtained the types in the British (Natural History) Museum.

sternum between the bases of the fifth ambulatory legs. Eye-peduncles short, robust. Antennules transversely or almost transversely plicated. Antennæ situated in the interior orbital hiatus; the basal joint is very short and does not reach the front, and is slightly produced at its antero-lateral angle; flagellum of moderate length. Exterior maxillipedes narrow, with a rhomboidal gape; the merus of the endognath is somewhat elongated and is rounded at the distal extremity, where the following joint is articulated; exognath small and slender. Chelipedes (in the adult male) usually subequal and moderately developed; merus trigonous; carpus usually angulated, without a spine on the interior margin; palm slightly compressed; fingers distally subacute, or but slightly excavated. Ambulatory legs moderately elongated; merus-joints compressed, and usually armed with a subdistal spine or tooth on their superior margins; dactyli styliform, slightly compressed, and without spines.

The described species are very numerous, and are of common occurrence on the shores and in the shallow waters of all the tropical and subtropical regions of the globe. They occur on the African coast southward at least to Natal, and one species (*Sesarma pentagona*, Hutton) has been described from New Zealand.

The following are forms which are not referred to by Mr. Kingsley in his list of the species of this genus. Except *Sesarma miniata*, they are all too recently described to be inserted in it:—

Sesarma miniata, de Saussure. West Indies.
Sesarma granosimana, Miers. Indo-Malaysian Seas.
Sesarma büttikoferi, de Man. Liberia.
Sesarma kamermani, de Man. Congo Coast.[1]

Sesarma mülleri, A. Milne Edwards (Pl. XXI. fig. 3).

Sesarma mülleri, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. v., Bulletin, p. 29, 1869.
„ „ Kingsley, *tom. cit.*, p. 216, 1880.

Bahia, shallow water (a small male).

The identification is somewhat uncertain, since the diagnosis of the species is brief.[2]

♂.	Lines.	Millims.
Length of carapace, rather over	5	11
Breadth of carapace,	6½	13·5

[1] I have proposed (*Proc. Zool. Soc. Lond.*, p. 70, 1881) *Sesarma stimpsonii* as an alternative name for specimens from Monte Video, doubtfully referred to *Sesarma angustipes*.

[2] This specimen differs from much larger examples in the collection of the British Museum, which have also been referred to *Sesarma mülleri*, in having the frontal margin perfectly straight without a median sinus, the sutures defining the postfrontal or epigastric lobes less deep and distinct, the sides of the carapace behind the exterior angle of the orbit more distinctly convergent; the superior margin of the dactyl of the chelipedes is less distinctly granulated, but the palm is more distinctly granulated. The carapace in the largest specimen in the British Museum measures nearly 16 lines (33·5 mm.) in length, and about 17½ lines (37 mm.) in width.

Sesarma schüttei, Hess.

Sesarma schüttei, Hess, Archiv f. Naturgesch., vol. xxxi. p. 150, pl. vi. fig. 11*, 1865.
„ „ Kingsley, *tom. cit.*, p. 217, 1880.
„ „ Haswell, Cat. Aust. Crust., p. 109, 1882.

New South Wales, Hawkesbury, brackish water (an adult male).

This specimen is without the chelipedes, but it agrees in all particulars with the description of Hess. The colour (in spirit) is purplish or blackish-brown.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	8½	17·5
Breadth of carapace, nearly	10	20·5

Sesarma (*Holometopus*) *aubryi*, A. Milne Edwards.

Sesarma (*Holometopus*) *aubryi*, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. v., Bulletin, p. 29, 1869 ; vol. ix. p. 307, pl. xvi. fig. 3, 1873.
„ *aubryi*, Kingsley, *tom. cit.*, p. 214, 1880.

New Hebrides, Api (in sea-water), a series of specimens (males and females); Arrou Islands (a female); Wild Islands, Admiralty Island (on the beach), several specimens, males and females.

Adult ♂.	Lines.	Millims.
Length of carapace, about	4½	10
Breadth of carapace, about	5	11
Length of a chelipede,	5½	11·5
Length of first ambulatory leg,	6½	13

Subfamily 2. PLAGUSIINÆ.

Plagusiinæ, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 333, 1852.
„ Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. i. p. 147, 1878.
„ Kingsley, *tom. cit.*, p. 223, 1880.

Carapace much depressed; antennules transverse, and exposed and visible in a dorsal view in deep longitudinal clefts or sinuses of the front.

This subfamily includes only the genera *Plagusia*, Latreille, and *Leiolophus*, Miers (=*Acanthopus*, de Haan, *nom. præoc.*).

Plagusia, Latreille.

Plagusia, Latreille (pt.), Gen. Crust. et Ins., vol. i. p. 33, 1806.
„ Milne Edwards (pt.), Hist. Nat. Crust., vol. ii. p. 90, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 178, 1853.
„ Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. i. p. 148, 1878, et synonyma.

Carapace depressed, and little, if at all, broader than long; with the antero-lateral margins dentated, and slightly divergent to the bases of the third pair of legs. The front

is not deflexed, is less than half the width of the carapace, and is deeply cleft by the antennulary fossæ; these fossæ, in which the antennules are vertically plicated, are open in a dorsal view.

The orbits are deep, and their interior hiatuses are large and open. The epistoma is very short and transverse. The anterior margin of the buccal cavity is cristated. The endostomian ridges are usually distinctly developed. The post-abdomen (in the male) is broad and triangulate, and occupies at the base the whole width of the sternum between the coxæ of the fifth ambulatory legs, and is distinctly seven-jointed. The eye-peduncles are very short and robust. The basal joint of the antennæ is considerably dilated and is slightly produced at its anterior angles; the antero-internal angle reaches the front, and the following joint is articulated in the middle of the distal margin of the basal antennal joint.

The exterior maxillipedes are rather small; the merus of the endognath is shorter than the ischium, but not narrower at the base than that joint, distally truncated, and bears the next joint at its summit; the exognath is slender. Chelipedes (in the male) subequal, and moderately developed; merus trigonous, carpus and palm usually granulated; palm rounded above and not dilated; fingers distally excavated, with corneous tips. Ambulatory legs large and robust; the merus-joints compressed, and with one or more spines on the anterior margin; dactyli strongly spinuliferous.

In the nearly allied genus *Leiolophus*, the merus-joint of the exterior maxillipedes is very small; much narrower at the base than the distal extremity of the ischium, and the dorsal surface of the carapace is marked with smooth naked lines or ridges.

Plagusia depressa (Fabricius).

Cancer depressus, Fabricius, Entom. Syst. Suppl., p. 406, 1775.
Cancer squamosus, Herbst, Naturgesch. der Krabben u. Krebse, vol. i. p. 260, pl. xx. fig. 113, *bad*, 1790.
Plagusia depressa, Say, Journ. Acad. Nat. Sci. Philad., vol. i. p. 100, 1815.
" " Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. i. p. 149, 1878, and references to synonyma.
" " de Man, Notes Leyden Mus., vol. v. p. 168, 1883.
" *tuberculata*, Lamarck, Hist. Anim. sans Vert., p. 247, 1818.
" " (var.), Miers, *tom. cit.*, p. 148, 1878, et synonyma.

St. Vincent, Cape Verde Islands, July 1873 (an adult male).

In this specimen the lobes above the bases of the second and third ambulatory legs are either not at all or very obscurely dentated. There can be little doubt that the Indo-Pacific form (*Plagusia tuberculata*, Lamarck), which I, following the late Dr. Stimpson, regarded as a distinct species, on material which further research has shown

to be insufficient, is to be regarded as merely a variety of the Atlantic *Plagusia depressa*.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	21	44
Breadth of carapace, nearly	22½	47·5

Plagusia immaculata, Lamarck (Pl. XXII. fig. 1).

Plagusia immaculata, Lamarck, Hist. Anim. sans Vert., v. p. 247, 1818.
„ „ Miers, Ann. and Mag. Nat. Hist., *tom. cit.*, p. 150, 1878.
„ *depressa*, Latreille, Encycl. Méth., x. p. 145, 1825.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 93, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 179, 1853, *nec Cancer depressus*, Fabricius.

North of New Guinea, from driftwood, February 21, 22, 1875 (a female and several small males).

The largest male measures as follows:—

♂.	Lines.	Millims.
Length of carapace, nearly	8½	17·5
Breadth of carapace,	9	19

It is possible that this form, like the preceding, may prove to be merely a small convex, smoother and glabrous variety of *Plagusia depressa*, but I hesitate to unite it with that species on the authority of the series at present contained in the collection of the British (Natural History) Museum and in the Challenger collection.[1]

Plagusia chabrus (Linné) (Pl. XXII. fig. 1*d*).

Cancer chabrus, Linné, Mus. Lud. Ulrici, p. 438, 1764; Syst. Nat., ed. xii. p. 1044, 1766.
Plagusia chabrus, White, Ann. and Mag. Nat. Hist., vol. xvii. p. 497, 1846.
„ „ Miers, *tom. cit.*, p. 152, 1878.
„ *tomentosa*, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 92, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 178, 1853.
„ „ Krauss, Die Süd-Afrik. Crust., p. 42, pl. ii. fig. 6, 1843.

South Africa, Simon's Bay, 10 to 20 fathoms (an adult male and a young example).[2]

Adult ♂.	Lines.	Millims.
Length of carapace,	19	40·5
Breadth of carapace, about	21	44

[1] The British Museum has lately received specimens of the very distinct *Plagusia speciosa*, Dana (of which I had seen no specimens when I revised the species of this subfamily in 1877), from Paumotu.

[2] In the South African specimens of this species, which I have examined, the branchial regions are smooth, or very nearly so; in specimens from New Zealand they bear several small ridges or tubercles near the posterior lateral angles, but I do not think this to be a character of specific importance, though a larger series might show it to be so.

Family IV. PINNOTHERIDÆ.

Pinnotheriens, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 28, 1837.

Carapace usually more or less membranaceous, convex or depressed, with the antero-lateral margins entire or but very slightly dentated; front, orbits, and eye-peduncles very small. The post-abdomen of the male usually does not cover the sternum between the bases of the fifth ambulatory legs. The buccal cavity is usually arcuated anteriorly. The merus (and usually the ischium) of the exterior maxillipedes is well developed, and the carpal joint is articulated at the summit or at the antero-internal angle, or more rarely at the antero-external angle of the merus. Chelipedes (in the adult males) small, or moderately developed; ambulatory legs slender and usually naked; dactyli styliform, unarmed.

The species are of small size, and many are found living within the shells of bivalve Mollusca, *Echini*, tubicolous Annelida, &c.

However characterised, the Pinnotheridæ constitute at present a somewhat heterogeneous group, which I think it most convenient to define in the sense originally indicated by Milne Edwards in 1834. In his later monograph (1852, 1853) Milne Edwards separated *Myctiris*, *Scopimera*, and *Doto* (*Dotilla*) from the Pinnotheridæ. By Dana (1852) *Myctiris* is constituted the type of a distinct family and arranged next to the Pinnotheridæ, but *Scopimera* and *Dotilla* are widely separated from *Myctiris* and placed in the Macrophthalmidæ.

The few forms occurring in the collection of H.M.S. Challenger must be arranged in three distinct subfamilies, as will be seen in the following synoptical arrangement of the genera of this group, wherein I have recharacterised the subdivisions established by Milne Edwards, and have added a new subfamily to those previously established, which includes a few forms not represented in the Challenger collection.

Subfamily 1. PINNOTHERINÆ.

Pinnotherinæ, Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 216, 1853.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 378, 1852.

Carapace usually convex, subglobose or transverse. Front not rostrated. Ischium joint of the exterior maxillipedes usually rudimentary or very short; dactyli of the ambulatory legs very short. The ambulatory legs all well developed.

Genera:—*Pinnotheres*, Latreille; *Ostracotheres*, Milne Edwards; *Pinnixa*, White (= *Tubicola*, Lockington); *Xanthasia*, White; *Pinnotherelia*, Lucas; *Fabia*, Dana; *Pinnaxodes*, Heller (?); *Dissodactylus*, Smith (?);[1] *Malacosoma*, de Man; *Holothuriophilus*, Nauck.

[1] This genus is regarded by S. I. Smith as typical of a distinct subfamily.

Subfamily 2. Hexapodinæ.

? *Asthenognathidæ*, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 107, 1858, *descript. nullâ.*

Characters of Pinnotherinæ, but the ischium of the exterior maxillipedes and the dactyli of the ambulatory legs are longer and more distinctly developed, and the ambulatory legs of the fifth pair, which are often short in *Pinnixa*, are altogether aborted or represented by a mere rudiment.

Genera:—*Hexapus*, de Haan; *Amorphopus*, Bell; *Thaumastoplax*, Miers; *Asthenognathus*, Stimpson, may belong to this group, but nothing is said with regard to the form of the fifth ambulatory legs, if developed; *Xenophthalmus*, White, which is somewhat intermediate between this group and the Pinnotherinæ, differs from the genera of both groups in the form of the orbits, which are narrow, longitudinal and open above.

Subfamily 3. Myctirinæ.

Carapace very convex, usually subglobose. Front rostrated; rostrum deflexed. The exterior maxillipedes bulge out beyond the buccal cavity, and the merus and ischium joints are largely developed. Dactyli of the ambulatory legs styliform, well developed. This subfamily establishes the transition to the Ocypodidæ.

Genera:—*Myctiris*, Latreille; *Dotilla*, Stimpson (*Doto*, de Haan); *Scopimera*, de Haan.

Subfamily 4. Hymenosominæ.

Hymenosominæ, Milne Edwards, *tom. cit.*, p. 221, 1853.
Hymenicinæ, Dana, *tom. cit.*, p. 379, 1852.

Carapace flattened on the dorsal surface, more or less, triangulate. Front rostrated. Ischium of the exterior maxillipedes and dactyli of the ambulatory legs well developed.

Genera:—*Hymenosoma*, Desmarest; *Halicarcinus*, White (=*Liriopea*, Nicolet); *Hymenicus*, Dana; *Elamena*, Milne Edwards; *Elamenopsis*, A. Milne Edwards; *Trigonoplax*, Milne Edwards; *Rhynchoplax*, Stimpson.

Subfamily 1. Pinnotherinæ.

Pinnotheres, Latreille.

Pinnotheres, Latreille, Hist. Nat. Crust. et Ins., vol. vi. p. 78, 1803–1804.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 30, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 216, 1853.
Pinnothera, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 378, 1852.

Body soft and membranaceous; carapace smooth, subglobose, the regions not defined, the lateral margins regularly arcuated; orbits very small, usually nearly circular, with

the margins subentire and very little prominent. Front narrow, with the anterior margin nearly straight. Epistoma very short and transverse. Buccal cavity wide and transverse, and anteriorly arcuated, the endostomian ridges obsolete or nearly so. Post-abdomen narrow and distinctly seven-jointed, its base does not cover the whole width of the sternum between the coxæ of the fifth ambulatory legs. Eye-peduncles very short. Antennules transversely plicated within the small fossettes, which are little broader than long. Antennæ very small and placed within the anterior hiatus of the orbit; basal antennal joint slender and short, barely attaining the infero-lateral angle of the front. Exterior maxillipedes oblique, with the ischium-joints of the endognath short or rudimentary, the merus very large, usually curved, and widening more or less to the distal extremity, which is rounded or subtruncated, the small dactyl articulated on the interior margin of the penultimate joint. Chelipedes in the male small, with the joints smooth, merus trigonous, carpus without a spine on its anterior margin, palm slightly compressed and rounded above and below, fingers acute. Ambulatory legs of moderate length and very slender, with the joints smooth; dactyli slightly arcuated and usually shorter than the penultimate joints.

The species are all of small size, and (as is well known), inhabit the shells of *Mytilus*, *Pinna*, and other bivalves, and are found probably in all the temperate and tropical regions of the globe.

The following species are either not referred to or have been added since the publication of Milne Edwards's Memoir in 1853. As the discrimination of the species is difficult, and a revision of the genus is much needed, it is possible that some are not really specifically distinct.

Pinnotheres maculatum, Say.
Pinnotheres byssomiæ, Say.
Pinnotheres depressum, Say.
Pinnotheres monodactylum, Say.
} All from the Eastern and Southern Coasts of the United States.

Pinnotheres pholadis, de Haan. Japan.
Pinnotheres obscurus, Stimpson. Hong-Kong.
Pinnotheres boninensis, Stimpson. Bonin Island.
Pinnotheres parvulus, Stimpson. China Seas.
Pinnotheres margarita, Smith. Bay of Panama, Pearl Islands, and Lower California.
Pinnotheres lithodomi, Smith. Pearl Islands and Lower California.
Pinnotheres ascidiicola, Hesse. Coast of France.
Pinnotheres pectunculi, Hesse. France.
Pinnotheres angelicus, Lockington. Gulf of California.
Pinnotheres flavus, Nauck. Philippines.

Pinnotheres villosulus, Guérin-Ménéville (Pl. XXII. fig. 2).

Pinnotheres villosulus, Guérin-Ménéville, Crust. in Voy. de la "Coquille," vol. ii. p. 13, 1830; Icon. du Règne Animal, Crust., p. 7, pl. iv. fig. 6.
„ „ Milne Edwards, Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 218, pl. xi. fig. 8, 1853.
? „ „ Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 247, 1884.

Torres Strait (found within the pearl-oyster). An adult female was presented to the Challenger staff at Sydney, in June 1874.

As this specimen differs somewhat from the descriptions and figures in the form of the exterior maxillipedes, &c., I append the following description. I had at first regarded it as specifically distinct.

The body is everywhere clothed with a short close pubescence. The carapace (in the single specimen examined) is somewhat indurated for a species of this genus and rather flat, with an obscure prominence on the gastric and cardiac region; the general outline is nearly circular, the lateral margin is thin-edged and acute on the sides of the branchial regions. The front is deflexed and trilobate, the median lobe broad, triangulate, the lateral lobes small and dentiform, and constituting the inner angles of the orbits, which are small, nearly circular, with a wide inner hiatus. The post-abdomen (in the female) covers the whole sternal surface, and all the segments are distinct. The eyes are very small, with short thick peduncles and minute terminal corneæ. The antennules lie somewhat obliquely in very large fossettes. The joints of the peduncles of the antennæ are large and robust, and are apparently partly coalescent with one another and with the inferior wall of the orbit; the flagellum minute and rudimentary. The outer maxillipedes are of moderate size; merus elongated, and widening somewhat to the distal extremity; carpus and penultimate joints robust and rather short, the penultimate joint but slightly rounded at the distal extremity, the dactylus minute, articulated at the middle of the inner margin of the penultimate joint, and not nearly reaching to its distal extremity; exognath rudimentary. The chelipedes (in the female) are equal and moderately robust; merus and carpus subequal, without spines or teeth; palm little longer than the carpus, rounded above and smooth on its outer surface; fingers meeting along their inner edges and acute at the apices. Ambulatory legs moderately robust and slightly compressed; dactyli slender, acute, half as long as the penultimate joints. Colour (in spirit) greyish-brown. The single specimen (an adult female) has the following dimensions:—

Adult ♀.	Lines.	Millims.
Length of carapace,	6½	13·5
Breadth of carapace, nearly	7	14
Length of a chelipede, rather over	6	13
Length of second ambulatory leg, about	7	15

Subfamily 2. Myctirinæ.

Myctiris, Latreille.

Myctiris, Latreille (*Mictyris*), Crust. in Cuvier, Règne Anim., ed. 1, vol. iii. p. 21, 1817.
Milne Edwards (*Myctiris*), Hist. Nat. Crust., vol. ii. p. 36, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 154, 1852.

Body very thick and dorsally convex, nearly smooth, with the cervical and cardiaco-branchial sutures strongly defined. There are no distinct orbits, but a small postocular spine. The front is very narrow and deflexed, and is triangulate or subacute at the distal extremity. The epistoma is very short and transverse. The post-abdomen in the male, as in the female, is broad, and widens from the base to the penultimate segment; the terminal segment is narrow, and rounded at the distal extremity. The eyes are very short and exposed in a dorsal view. The antennules and antennæ are very small; the antennæ in particular very short and slender, and inserted beneath the bases of the eye-peduncles. The exterior maxillipedes project very markedly from the buccal cavity, and are closely applied to one another along their inner margins; the ischium is largely developed and truncated at the distal extremity; the merus is somewhat narrowed and rounded at the distal extremity, where it bears the following joint. The chelipedes (in the male) are slender and moderately elongated; carpus and palm compressed, and usually carinated above, carpus usually longitudinally sulcated on the exterior surface; palm very short; fingers straight and acute; dactylus with only one large tooth on the inner margin near the base. Ambulatory legs slender and somewhat elongated; dactyli nearly straight, and not denticulated on the margins.

The following species are referable to this genus, *Myctiris longicarpus*, White (=*Myctiris brevidactylus*, Stimpson ?), common on the shores of Australia, and occurring in the Malaysian subregion and at New Caledonia, and *Myctiris platycheles*, Milne Edwards (=*Myctiris subverrucatus*, White), common in Australia.

Myctiris deflexifrons, a species mentioned by de Haan, has apparently never been described.

Myctiris longicarpus, Latreille.

Mictyris longicarpus, Latreille, Gen. Crust. et Ins., vol. i. p. 41, 1806.
Myctiris longicarpus(is), Milne Edwards, Hist. Nat. Crust., vol. ii. p. 37, 1837; Crust. in Cuvier, Règne Anim., pl. xviii. fig. 2; Ann. d. Sci. Nat., ser. 3, Zool., vol. xviii. p. 154, 1852.
Mycteris longicarpus, Haswell, Cat. Australian Crust., p. 116, 1882.
Myctiris brevidactylus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 99, 1858, var.

Albany Island, near Cape York, North Australia. Numerous specimens, none of large size, were collected.

An adult male measures as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace,	6½	13·5
Breadth of carapace,	5½	11·5

This species nearly resembles the following, but may always be distinguished by the smooth, not granulated, dorsal surface of the carapace.

Myctiris platycheles, Milne Edwards.

Myctiris platycheles, Milne Edwards, Ann. d. Sci. Nat., *tom. cit.*, p. 154, 1852.
„ „ Targioni-Tozzetti, Crostacei del Viaggio della Magenta, p. 186, pl. xi. fig. 6, *a–e*, 1877.
„ „ Haswell, *tom. cit.*, p. 117, 1882 (*Mycteris*).
„ *subverrucatus*, White, List Crust. Brit. Mus. p. 34, 1847; *descript. nullâ*.
„ „ Kinahan, Journ. Roy. Dublin Soc., vol. i. p. 123, 1858.

New South Wales, Botany Bay (beach). A good series of specimens.

Adult ♂.	Lines.	Millims.
Length of carapace,	8	17
Breadth of carapace, nearly	7	14

Subfamily 3. HYMENOSOMINÆ.

Hymenosoma, Leach.

Hymenosoma, Leach (*ined.* ?), Desmarest, Considd. sur les Crust., p. 163, 1825.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 35, 1837; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 222, 1853.

Carapace dorsally flattened, and rounded on the posterior and lateral margins, which are defined by a granulated line or ridge, which is not dentated, as in *Halicarcinus;* beneath this line the carapace usually slopes outwards obliquely to the bases of the ambulatory legs. The front is simple, triangulate, and nearly horizontal; the hepatic region is tuberculated. There is a distinct postocular spine or tooth. Scarcely any trace exists of an epistoma, or of longitudinal ridges on the endostome. The post-abdomen of the male is very narrow, and is six-jointed, and its base barely occupies the whole width of the sternum between the last ambulatory legs; the sternum is large and circular. The eye-peduncles are short; the antennulary fossettes are not separated from the orbits; the antennæ are somewhat elongated, and their basal joint is very short. The exterior maxillipedes are not arcuated, and have the ischium and merus-joints well developed, the merus usually obliquely truncated, and bearing the following joint near its antero-external angle, at the distal extremity. The chelipedes in the adult male are

subequal and rather slender, with the merus (in the species I have examined) short and rounded, or obscurely trigonous; carpus without a spine or tooth on the inner margin; palm small, compressed; fingers straight and distally acute. Ambulatory legs very slender and of moderate length; dactyli nearly straight and as long as or longer than the penultimate joints.

Two of the described species of this genus (which are possibly not distinct the one from the other) *Hymenosoma orbiculare*, Latreille, and *Hymenosoma geometricum*, Stimpson, occur at the Cape of Good Hope in rather shallow water; a third species, referred by Milne Edwards to this genus, *Hymenosoma gaudichaudii*, Guérin-Ménéville, occurs on the Australian coasts.[1]

Hymenosoma orbiculare, Desmarest.

Hymenosoma orbiculare, Desmarest, Consid. sur les Crust., p. 163, pl. xxvi. fig. 1, 1825.
" " Milne Edwards, Hist. Nat. Crust., vol. ii. p. 36, 1837; Crust. in Cuvier, Règne Anim., ed. 3, Atlas, pl. xxxv. fig. 1; Ann. d. Sci. Nat., ser. 3, Zool., vol. xx. p. 222, 1853.
Leachium orbiculare, MacLeay, Invert. in Smith, Zool. South Africa, p. 68, 1849.
Hymenosoma geometricum, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 108, 1858, var. (?)

Numerous specimens were collected in Simon's Bay, South Africa, in 5 to 20 fathoms (mostly of small size).

The largest male in the series has the following dimensions:—

	Lines.	Millims.
Length of carapace,	5½	11·5
Greatest breadth of carapace, rather over	5	11
Length of a chelipede,	6	12·5
Length of second ambulatory leg, rather over	10	21·5

Halicarcinus, White.

Halicarcinus, White, Ann. and Mag. Nat. Hist., ser. 1, vol. xviii. p. 178, 1846.
" Milne Edwards, Ann. d. Sci. Nat. ser. 3, Zool., vol. xx. p. 222, 1853.
Liriopea, Nicolet, in Gay, Hist. de Chile, Zool., vol. iii., Crust., p. 160, pl. i. fig. 1, 1849.

This genus is very nearly allied to the preceding (*Hymenosoma*), but the typical species may be distinguished by the following characters:—The carapace is more transverse and rounded, less distinctly triangulate. The front is distinctly trilobated. The epistoma is transverse and distinctly developed. The basal segment of the post-abdomen in the male occupies the whole width of the sternum, between the bases of the fifth ambulatory legs. The exterior maxillipedes (in the typical species at least) are more robust, the ischium

[1] Mr. W. A. Haswell, in his recent Catalogue of the Australian Crustacea, would unite with *Hymenosoma* all the species referred by authors to *Hymenicus*, Dana, and *Halicarcinus*, White.

and merus-joints broader and shorter. The chelipedes and ambulatory legs resemble those of *Hymenosoma* but the chelipedes are more robust and more strongly developed, with the palms more turgid, and the dactyli of the ambulatory legs are more distinctly falcated.

The following forms seem to be referable to this genus, which is distinguishable from *Hymenosoma* and *Hymenicus* by the distinctly trilobated front, whose lobes are separated to the base :—

Halicarcinus planatus. Common throughout the whole Antarctic Region.
Halicarcinus ovatus, Stimpson. The representative on the Australian Coasts of *Halicarcinus planatus.*
Halicarcinus leachii, Nicolet. Chili.
Halicarcinus lucasii, Nicolet. Chili.

Halicarcinus planatus (Fabricius).

Cancer planatus, Fabricius, Entom. Syst., vol. ii. p. 446, 1793.
Halicarcinus planatus, White, Ann. and Mag. Nat. Hist., vol. xviii. p. 178, pl. ii. fig. 1, 1846.
" " Milne Edwards, Ann. d. Sci. Nat., ser. 3, vol. xx. p. 222, 1853.
" " Miers, Phil. Trans., vol. clxviii. p. 201, 1879, et synonyma.
Hymenosoma planatum, Haswell, Cat. Australian Crust., p. 114, 1882.

Specimens of this common and widely distributed inhabitant of the Antarctic or Austral region, and which is the only Brachyurous Decapod proper to that wide area of distribution, occurred at the following localities :—

Between the Cape of Good Hope and Kerguelen (near Marion Island) on December 26, 1873, in 50 to 75 fathoms (an adult female); off Prince Edward Island, 85 to 150 fathoms (an adult female); at Kerguelen Island, in rock-pools (a male and a female); New Zealand, Cape Campbell (an adult male, from the Wellington Museum); Falkland Islands, 4 fathoms, in lat. 51° 32′ 0″ S., long. 58° 6′ 0″ W., Station 316 (five males and females); Port William (an adult male).

One of the specimens from the Falkland Islands (Station 316) has the carapace somewhat more hairy and convex than is usual in the species.

An adult male measures as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace, about	5	11
Breadth of carapace, about	6½	13·5

Halicarcinus ovatus, Stimpson.

Halicarcinus ovatus, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 109, 1858; Targioni-Tozetti, Crostacei brachiuri e anomouri del viaggio della "Magenta," p. 173, pl. x. fig. 5, *a–d*; pl. xi. figs. 3, 3*a*, 1877.

An adult, but small female was obtained off the South Australian Coast, in 2 to 10 fathoms, in April 1874, and two young specimens off the entrance to Port Philip, in 33 fathoms (Station 161).

This species, which I formerly regarded as synonymous with *Halicarcinus planatus*,[1] can apparently always be distinguished by the more triangulate form of the carapace and the flattened triangulate frontal teeth, which are closely approximated at their bases. The species, so far as I am aware, does not occur elsewhere than in the Australian Seas.

Adult ♀.	Lines.	Millims.
Length of carapace,	2½	5
Breadth of carapace, nearly	3	6

OXYSTOMATA or LEUCOSIIDEA.

Orbiculata, Latreille (pt.), Fam. Nat., p. 271, 1825.
Oxystomes, Milne Edwards (pt.), Hist. Nat. Crust., vol. i. p. 265, 1834; vol. ii. p. 96, 1837.
Leucosoidea vel *Oxystomata*, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, pp. 68, 389, 1825.
Oxystomata, Miers, Cat. New Zeal. Crust., p. 54, 1876.

Family I. CALAPPIDÆ.

Calappiens (pt.), Milne Edwards, Hist. Nat. Crust., vol. ii. p. 100, 1837.
Calappidæ, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 390, 1852.
„ Miers, Cat. New Zeal. Crust., p. 54, 1876.

Afferent canals to the branchiæ opening behind the pterygostomian regions, and in front of the chelipedes; the carpal and following joints of the merus of the endognath of the exterior maxillipedes are not wholly concealed by the merus-joint. (The intromittent sexual organs in the male are exserted from the bases of the legs of the fifth pair.)

[1] Cat. New Zeal. Crust., p. 49, 1876.

Subfamily 1. CALAPPINÆ.

Calappinæ, Dana, *tom. cit.*, p. 390, 1852.

The eight posterior legs are gressorial, not natatorial, *i.e.*, the dactyli not dilated and expanded.

The genera referred to this subfamily are:—*Camara*, de Haan; *Calappa*, Fabricius (= *Lophos*, de Haan, subgenus; *Gallus*, de Haan, subgenus); *Paracycloïs*, n. gen.; *Mursia*, Desmarest (= *Thealia*, Lucas); *Cryptosoma*, Brullé (= *Cycloës*, de Haan); *Platymera*, Milne Edwards; *Acanthocarpus*, Stimpson.

Subfamily 2. ORITHYINÆ.

Orithyinæ, Dana, *tom. cit.*, p. 391, 1852.

The eight posterior legs are natatorial, *i.e.*, with the dactyli more or less dilated and compressed, those of the fifth pair lanceolate, ovate.

Genus:—*Orithyia*, Fabricius.

This subfamily is not represented in the Challenger collection.

Calappa, Fabricius.

Calappa, Fabricius, Entom. Syst. Suppl., p. 345, 1798.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 102, 1837.
Lophos, de Haan, subgenus, Crust. in v. Siebold, Fauna Japonica, decas iii. p. 69, 1837.
Gallus, de Haan, subgenus, *tom. cit.*, p. 70, 1837.

Carapace very convex and tuberculated, rounded in front, with the antero-lateral margins regularly arcuated and granulated or toothed; and the postero-lateral margins prolonged into two large rounded wings or clypeiform expansions, which partly cover the ambulatory legs, but are not developed to so great a degree as in *Camara*, de Haan, and are dentated on the margins, not entire, as in that genus. The front is very small, triangulate or concave in the median line. Orbits very small, circular. The post-abdomen (in the male) covers the sternum at the base, between the bases of the fifth ambulatory legs, and is usually five-jointed. Eye-peduncles short, robust. Antennules nearly vertically plicated. Antennæ with the basal joint usually more or less dilated, and occupying the wide inferior hiatus of the orbit; flagellum short. The exterior maxillipedes do not entirely cover the buccal cavity (which is narrowed and prolonged in its anterior part, and divided by a median septum); their ischium-joint is not produced at its antero-internal angle; the merus is subacute or distally truncated, and emarginate at the antero-internal angle, where the next joint is articulated. The chelipedes are equal and very large, and can be closely applied to the body; merus and carpus trigonous, palm vertically very deep, and laterally compressed, and armed above with a strongly dentated crest; the fingers of the right and left chelipedes are usually somewhat dissimilar, and are acute at the distal extremity. Ambulatory legs slender and of moderate length, with the dactyli styliform.

The species are rarely found in deep water.

The following are species of this genus which have been described since the publication of Milne Edwards's work in 1837.

Calappa convexa, Saussure (= *Calappa xantusiana*, Stimpson). West Coast of Mexico; California. (This species is the western representative of, or perhaps identical with, *Calappa gallus*).

Calappa rubroguttata, Herklots (= *Calappa bocagei*, B. Capello). West Africa.

Calappa pelii, Herklots. West Africa.

Calappa guérinii, B. Capello. India, Yanaou.

Calappa moniziana, B. Capello. Cape of Good Hope.

Calappa angustata, A. Milne Edwards. West Indian Seas (to 115 fathoms).

Calappa depressa, n. sp. South Australia.

I have described a new variety of *Calappa gallus* (var. *bicornis*) from the Providence Islands and Indian Ocean. M. de Haan also refers to a species, *Calappa gallina* (Herbst), not mentioned by Milne Edwards.

Calappa flammea (Herbst) (Pl. XXIII. fig. 1).

? *Cancer flammea*, Herbst, Naturgesch. der Krabben u. Krebse, vol. ii. p. 161, pl. xl. fig. 2, 1793.
Calappa flammea, Bosc, Hist. Nat. Crust., vol. i. p. 185 (?).
„ „ White, List Crust. Brit. Mus., p. 44, 1847.
„ *marmorata*, Desmarest, Consid. sur les Crust., p. 109, 1825 (?).
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 104, 1837.
„ „ Gibbes, Proc. Amer. Assoc. Adv. Sci., p. 183, 1850.
„ „ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 402, 1879; not *Calappa marmorata*, Fabricius,
„ *granulata*, de Haan, Crust. in v. Siebold, Fauna Japonica, dec. iii. p. 70, 1837; not *Cancer granulatus*, Linnæus (*type*) (?).

An adult female and two smaller females are in the collection from Bermuda, and an adult male labelled as from Simon's Bay, Cape of Good Hope, 10 to 20 fathoms.[1]

Adult ♀.	Lines.	Millims.
Length of carapace,	40	84·5
Breadth of carapace,	58½	124

The adult male from the Cape is rather smaller.

[1] Herbst's name is cited by Milne Edwards for this species, and must be adopted, as having priority, if the quotation be correct, but it is possible that Herbst's species is not identical with this Atlantic and South African form. The brief description, however, and rude figure apply fairly well. In the adult female in the Challenger collection, from Bermuda, the faint brownish-pink markings on the carapace are scarcely reticulated; in the smaller specimens from Bermuda, and in the large male from the Cape of Good Hope, they are almost entirely absent; in an adult male from St. Croix, they form more distinct but still irregular reticulations, but in one from the collection of the late General Hardwicke, and presumably from the Indian Ocean, the reticulations on the anterior half of the carapace are very regular and distinct. Except in coloration the specimens from these widely distant localities do not present any marked distinctions. Herbst gives "Ostindien" as the habitat of his type.

Calappa hepatica (Linné).

Cancer hepaticus, Linné, Mus. Lud. Ulrici, p. 448, 1764; Syst. Nat., ed. xii. p. 1048, 1766.
„ *tuberculatus*, Herbst, Naturgesch. der Krabben u. Krebse, vol. i. p. 204, pl. xiii. fig. 78, 1790.
Calappa tuberculata, Fabricius, Entom. Syst. Suppl., p. 345, 1798.
„ „ Guérin, Icon. du Règne Animal, Altas, Crust., pl. xii. fig. 2.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 106, 1837.
„ „ Dana, U.S. Explor. Exped., vol. xiii., Crust., p. 393, 1852.
„ „ A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. x. p. 55, 1874.
„ *hepatica*, de Haan, Crust. in v. Siebold, Fauna Japonica, dec. iii. p. 70, 1837.
„ „ White, List Crust. Brit. Mus., p. 44, 1847.
„ „ Miers, Cat. New Zealand Crust., p. 55, 1876.
„ „ Haswell, Cat. Australian Crust., p. 136, 1882.
„ *sandwichien*, Eydoux and Souleyet, Crust. in Voy. de la "Bonite," Atlas, pl. iii. fig. 10, 1841–1852.

Specimens of this common and widely distributed species are in the collection from Tongatabu, reefs (an adult male); Amboina, 10 fathoms (an adult female); and Honolulu, reefs (an adult male and female).

The largest example (female from Honolulu) measures as follows:—

Adult ♀.	Lines.	Millims.
Length of carapace, about	20½	43·5
Breadth of carapace, about	33	70

Calappa granulata (Linné).

Cancer granulatus, Linné, Syst. Nat., ed. xii. p. 1043, 1766, *type*, not synonym.
„ „ Herbst, Naturgesch. der Krabben u. Krebse, vol. i. p. 200, pl. xii. figs. 75, 76, 1782.
Callappa granulata, Fabricius, Entom. Syst. Suppl., p. 346, 1798.
„ „ Latreille, Hist. Nat. Crust. et Ins., vol. v. p. 392, pl. xliii. figs 1, 2, 1803–1804, after Herbst.
„ „ Risso, Hist. Nat. de l'Europe méridionale, vol. v. p. 30, 1826.
„ „ Roux, Crust. de la Mediterranée, pls. ii. and xvi. 1828–1830.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 103, 1837; Crust. in Cuvier, Règne Animal, ed. 3, pl. xxxviii. fig. 1.
„ „ Heller, Crust. des südlichen Europa, p. 130, pl. iv. fig. 3, 1863.
Cancer sanguineo-guttatus, Herbst, *op. cit.*, vol. iii. pp. 20, 48, 1803, var. (?).
Callappa sanguineo-guttata, de Haan, Crust. in v. Siebold, Fauna Japonica, dec. iii. p. 70, 1837, var. (?).

Two small and immature specimens dredged off Fayal, in 50 to 90 fathoms, are referred to this species.

They scarcely differ from adult examples except in the more distinct tuberculation of the carapace. The colour is a nearly uniform yellowish-white.

Young.	Lines.	Millims.
Length of carapace, about	7	15
Breadth of carapace at lateral expansions,	8	17
Length of a chelipede, about	8	17

Calappa gallus (Herbst).

Cancer gallus, Herbst, Naturgesch. der Krabben u. Krebse, vol. iii. p. 46, pl. lviii. fig. 1, 1803.
Calappa gallus, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 105, 1837.
„ „ Dana, U.S. Explor. Exped., vol. xiii., Crust., p. 393, 1852.
„ „ F. de B. Capello, Journ. de Sci. Math. Phys. Nat. Lisboa, vol. iii. p. 133, pl. ii. fig. 4, 1871.
Gallus gallus, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 70, 1837.
Calappa galloides, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 71, 1859, var.

Bermuda, April 1873 (an adult female); Cape Verde Islands, St. Vincent, July 1873 (an adult male of large size).

Adult ♂.	Lines.	Millims.
Length of carapace,	27½	58·5
Breadth of carapace,	40½	85·5

Two very small and young specimens, dredged at the island of Fernando Noronha, in 7 to 20 fathoms, in September 1872, may perhaps belong to this species, but are too small for certain identification, the length of the carapace of the largest being only four lines (8·5 mm.).

To *Calappa gallus*, also, must, I think, be referred a small male dredged at Amboina in 15 to 25 fathoms, in October 1874, length of carapace nearly 5 lines (10 mm.), and breadth at lateral expansions 5½ lines (11·5 mm.), which has the carapace covered with smoother, more regularly disposed, rounded bosses or tubercles. Specimens of the same variety are in the collection of the British (Natural History) Museum from the Philippines (Cuming) and Oriental Seas (H.M.S. "Samarang"). The rostrum is not deeply notched as in the variety *bicornis*, Miers.

Calappa lophos (Herbst).

Cancer lophos, Herbst, Naturgesch. der Krabben u. Krebse, vol. i. (Heft. 1), p. 201, pl. xiii. fig. 77, 1782.
Calappa lophos, Fabricius, Entom. Syst. Suppl., p. 346, 1798.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 104, 1837.
„ „ White, List Crust. Brit. Mus., p. 45, 1847.
Lophos lophos, de Haan, Crust. in v. Siebold, Fauna Japonica, dec. iii. p. 72, pl. xx. fig. 1, 1837.

Off Port Jackson, June 3, 1874, in 30 to 35 fathoms (a very small male).

	Lines.	Millims.
Length of carapace, rather over	3	7
Breadth of carapace,	3½	7·5

This specimen is very doubtfully referred to *Calappa lophos*, on account of its very small size. The carapace is distinctly tuberculated (as in some varieties of *Calappa lophos*), but is not granulated and depressed as in *Calappa depressa*. Scarcely any

traces exist of the tubercles on the outer surface of the palms of the chelipedes, which are discernible in specimens of *Calappa lophos* of larger size but not fully grown.

Calappa depressa, n. sp. (Pl. XXIII. fig. 2).

Carapace much more depressed than is usual in the genus and comparatively narrow in proportion to its length; its surface is tuberculated and finely granulated. Of the tubercles (which are not large), there is a longitudinal median series on the gastric and cardiac regions, and several on either side of this series on the hepatic and front of the branchial regions; the postfrontal region is nearly smooth; the lateral clypeiform prolongations of the carapace are little developed, and are covered above with transverse, granulated, piliferous lines. The front projects but little, and is divided by a deep median notch. The antero-lateral margins of the carapace are very obscurely toothed; its clypeiform prolongations are armed on the sides with distant serratures and are posteriorly entire, as is also the posterior margin of the carapace. The ridge upon the pterygostomian region is marked by a notch or fissure, where it unites with the inferior wall of the orbit. All the post-abdominal segments (in the male) are distinct; the penultimate and terminal segments are the longest, the terminal longer than the penultimate segment, triangulate, and distally acute; the anterior margin of the third segment is a little broader than the base of the following (fourth) segment. The eye-peduncles are slender and elongated. The orbits, antennæ, and outer maxillipedes are very similar to the same parts in *Calappa lophos* (Herbst). The chelipedes also nearly resemble those of *Calappa lophos;* the merus having, as in that species, a strong transverse subdistal carina on its outer surface, which is not notched or spinose, but the carpus and the palms of the chelipedes are more granulated on their outer surface; the dactyl, also, is granulated externally near the base, and has (as in *Calappa lophos*), a rounded lobe on its upper margin close to the articulation with the palm. The ambulatory legs, as in other species of the genus, are small, smooth, slender, and compressed.

The colour (in spirit) is light yellowish-brown; the lateral expansions of the carapace, outer surface of the chelipedes, and the ambulatory legs of a pinker hue; the inner surface of the palms are brownish-pink upon a yellowish ground; the coloration being disposed, in places, in wavy lines.

Adult (?) ♀.	Lines.	Millims.
Length of carapace, nearly	9	18·5
Breadth of carapace at lateral expansions,	10½	22
Length of a chelipede,	10	21
Length of second ambulatory leg,	9	19

A female, probably adult, was obtained off the South Australian Coast, in 2 to 10 fathoms, in April 1874.

The nearest ally to this species with which I am acquainted is *Calappa lophos* (Herbst), from which *Calappa depressa* is distinguished by the more depressed and tuberculated carapace, with less strongly-toothed lateral expansions, the more distinctly granulated chelipedes, &c.[1]

Young specimens of *Calappa hepatica* may be distinguished from *Calappa depressa* by their broader carapace, with less deeply emarginate front.

Paracycloïs, n. gen.

Carapace about as long as broad, and moderately convex; front narrow and trilobated; the median lobe rounded and much broader than the lateral lobes. No lateral epibranchial spine or tooth; the antero-lateral margins are regularly arcuated and entire; there is in the middle of each of the postero-lateral margins a strongly spiniferous lobe (the rudiment of the postero-lateral clypeiform prolongations of the carapace which are fully developed in *Calappa*). The subhepatic regions of the carapace are concave; the channel thus formed communicating with the antennary region (and thereby with the buccal cavity) by a notch situated between it and the inferior wall of the orbit. Post-abdominal segments distinct. Eye-peduncles short, robust, closely encased in the oval orbits. Antennules obliquely plicate. Antennæ with a quadrate basal joint, which does not reach the frontal margin, and a very short flagellum. Outer maxillipedes with the ischium longer than broad and longer than the merus, which is distally truncated, with the antero-internal angle very distinctly notched; the following joints are exposed as in *Calappa;* the exognath is slender, straight, and narrows slightly to its distal extremity, which does not reach the antero-external angle of the merus of the endognath. Chelipedes and ambulatory legs as in *Calappa* and *Cryptosoma*, and the description of these limbs in *Calappa* applies to *Paracycloïs.*

This remarkable type apparently connects the genera *Cryptosoma* and *Platymera* with *Calappa* through such forms as *Calappa* (*Gallus*) *gallus* (Herbst). As in these genera the merus of the outer maxillipedes is distally truncated, and bears the next joint at its antero-internal angle, which is prolonged in the form of a lobe or tooth, but *Paracycloïs* is distinguished from the first two of the above mentioned genera by the absence of any lateral spine on the margin of the carapace, and the broader basal antennal joint, and from *Calappa* by the absence of the clypeiform prolongations of the carapace, which are represented by a slight protuberance of the postero-lateral margins in *Paracycloïs*, which protuberance bears several strong spines.

[1] There are in the British Museum collection two small specimens of this species without special indication of locality, collected in the Voyage of H.M.S. "Samarang." All the specimens I have examined are of small size.

As in the genus *Mursia*, the posterior margin of the carapace bears distinct lobes or teeth; but *Mursia* is at once distinguished by the form of the merus of the exterior maxillipedes, and the strongly developed lateral spine of the carapace.

Acanthocarpus, Stimpson,[1] is (as its name imports), distinguished by the extraordinarily developed carpal (or meral) spine of the chelipedes.

Paracycloïs milne-edwardsii, n. sp. (Pl. XXIV. fig. 1).

The carapace is irregularly orbiculate, convex and broadest at a point situated a little in advance of the middle of the lateral margins; its dorsal surface, except on the intestinal region, and the postero-lateral parts of the branchial regions, is coarsely granulated and covered with low, smooth, rounded tubercles, which diminish in size towards the lateral and postero-lateral margins. The median frontal lobe is broadly rounded, with three low tubercles on its upper surface, the lateral margins of the carapace sweep round in a regular curve to the protuberances of the postero-lateral margins, which bear four unequal spines; the lateral and postero-lateral margins, and the parts of the carapace immediately adjoining the three tubercles of the posterior margin, are granulated. The pterygostomian regions are smooth. The post-abdomen (in the female) is rather narrow, with subparallel sides; the five first segments are transverse and short (the second segment with two small lateral protuberances), the sixth segment is quadrate, and slightly broader than long; the terminal segment is triangulate, somewhat longer than broad, and distally acute. The eye-peduncles are short and thick, and granulated above, the corneæ occupying a great part of their inferior surface. The quadrate basal joint of the antennæ lies loosely within the orbital hiatus, the following peduncular joints are slender and very short. The exterior maxillipedes have been already described; their ischium-joints are denticulated on the inner margins, and the merus-joints are slightly concave on their exterior surface. The chelipedes and ambulatory limbs are nearly as in *Calappa*, *e.g.*, *Calappa gallus;* as in that species the merus of the chelipedes has a subdistal crest on its outer surface, but this crest is armed with short spines (not dentated as in *Calappa gallus*); the merus, in front of this ridge, and the carpus and palm are externally granulated, and the carpus and palm also tuberculated, and the palm dentated on its upper margin, as in *Calappa gallus*, but the tubercles and spines are less prominent than in that species; the granules of the lower part of the exterior surface of the palm are very numerous and regular. As in specimens of *Calappa gallus* I have examined, the dactyli of the chelipedes are dissimilar; that of the left chelipede being much more slender than the right, and sinuated. The ambulatory legs are compressed, with the carpus-joints obscurely bicarinated above, and the carinæ (in the two last pairs) granulated; the merus in the fifth pair is denticulated on its inferior margin. Colour (in spirit) yellowish-white.

[1] *Bull. Mus. Comp. Zoöl.*, vol. ii. p. 153, 1871.

The unique specimen presents the following dimensions:—

Adult ♀.	Lines.	Millim
Length of carapace, about	23	49
Breadth of carapace,	23½	50
Length of a chelipede, about	24½	52
Length of first ambulatory leg,	25½	54

It was dredged north of the Admiralty Islands, in 150 fathoms, in lat. 1° 54′ 0″ S., long. 146° 39′ 40″ E. (Station 219).

Mursia, Desmarest.

Mursia, Desmarest, Consid. sur les Crust., p. 108, footnote, 1825.
„ Latreille, Crust. in Cuvier, Règne Animal, ed. 2, p. 39, 1829.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 109, 1837.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 391, 1852; not *Murcia* of Leach, MSS.
Thealia, Lucas, Ann. Soc. Entom. France, ser. 1, vol. viii. p. 577, 1839.
„ Dana, *tom. cit.*, p. 391, 1852.

Carapace transverse and moderately convex, with the dorsal surface tuberculated, some of the tubercles disposed in five longitudinal series; the antero-lateral margins regularly arcuated and terminating in a well-developed lateral epibranchial spine, the postero-lateral margins straight, and without any trace of the clypeiform expansions characteristic of *Calappa*. Front small, with a median tubercle or tooth. Orbits with usually one or two closed fissures in the superior margin and with a wider hiatus in the inferior margin. Subhepatic channels well developed, as in *Paracycloïs*. Post-abdomen in the male with two or three of the intermediate segments coalescent; it covers at the base the whole width of the sternum between the coxæ of the fifth ambulatory legs. The robust eye-peduncles fill or nearly fill the orbital cavities. The antennules are somewhat obliquely plicated. The basal antennal joint is rather slender, and occupies the interior hiatus of the orbit; the flagellum is well developed. The exterior maxillipedes (as in *Calappa*) do not cover the anterior part of the buccal cavity; the ischium of the endognath is not produced at its antero-internal angle; the merus is obliquely truncated at the distal extremity, and the carpal joint is articulated at the antero-external angle of the merus, the exognath is slender and straight. The chelipedes and ambulatory legs are nearly as in *Calappa*, but the chelipedes are much less developed, the palm not so deep, and the merus bears one or two distal spines, not a dentated crest, on the outer surface, and the ambulatory legs are relatively longer.

Besides the two species referred to below, *Mursia acanthophora* (Lucas) = *Mursia armata*, de Haan, is to be included in this genus. This species occurs in China and Japan.

In the nearly allied genus *Platymera*, Milne Edwards, the carapace is much more transverse, and the lateral spine very greatly developed, but in this genus the merus of the exterior maxillipedes is distally truncated, deeply notched on the inner margin, with a tooth or lobe at the antero-internal angle, above the point of articulation with the next joint, somewhat as in *Cryptosoma*.

Mursia cristimana.

Mursia mains en crête, Desmarest, Consid. sur les Crust., pl. ix. fig. 3, 1825.
Mursia cristata, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 109, 1837; Crust. in Cuvier, Règne Animal, ed. 3, pl. xiii. fig. 1.
„ „ Studer, Abhandl. d. k. Akad. d. Wiss. Berlin, p. 15, 1882; not *Murcia cristata*, Leach, in Coll. Brit. Mus.
"*Mursia cristimana*, Latreille," de Haan, Crust. in v. Siebold, Fauna Japonica, pp. 70, 73, 1837.
„ „ Krauss, Die süd-afrikanischen Crust., p. 52, 1843.
Cryptosoma orientis, Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 62, pl. xiii. fig. 4, 1848 var. (?).

Cape of Good Hope, Simon's Bay (an adult male); Sea Point, near Cape Town (an adult female); Agulhas Bank, in 150 fathoms, in lat. 35° 4′ 0″ S., long. 18° 37′ 0″ E., Station 142 (a male and two females).

The adult male from Simon's Bay is without chelipedes, and presents the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace,	13	27·5
Breadth of carapace, at base of lateral spines,	14½	31
Length of second ambulatory leg,	22½	47·5

Cryptosoma orientis of Adams and White differs in nothing but in the slightly broader front, with somewhat less prominent median tooth, and the somewhat straighter posterior margin of the carapace, and is probably only a variety of *Mursia cristimana*.

Mursia curtispina, n. sp. (Pl. XXIV. fig. 2).

This new species so nearly resembles in all its characters *Mursia armata*, de Haan (*Thealia acanthopora*, Lucas), that the detailed description which follows is scarcely needed; it is distinguished, however, by the somewhat narrower carapace, which has the antero-lateral margins more arcuated, and is armed with proportionately shorter lateral spines, and with three very small equal tubercles on the posterior margin, in place of the two larger prominences of *Mursia armata*. The front also is somewhat broader, with a smaller, less prominent median cusp.

The carapace, as in *Mursia armata*, is transverse, convex, and granulated; the

granules more regular and even than in that species; as in *Mursia armata*, its dorsal surface has five longitudinal series of larger granulated prominences, one of which is in the median line; the antero-lateral margins are minutely granulated; the lateral spine is short, about one-seventh the width of the carapace; the granuliform prominences of the posterior margin are scarcely larger than the granules of the antero-lateral margins. The frontal margin projects but little beyond the inner angles of the orbits and is armed with three small obtuse teeth, the median is scarcely more prominent than the lateral teeth. As in *Mursia armata*, the orbits have a closed fissure in their superior margins and a deep and well-defined hiatus in the inferior margins; the inner subocular lobe of the orbit is prominent and subacute; the subhepatic regions of the carapace are deeply channelled, as in *Mursia armata*. All the segments of the post-abdomen (in the female) are distinct; the second segment is armed with a trilobate crest, as in *Mursia armata*, but the lobes are broader, more prominent, and entire. The eyes, antennæ, and outer maxillipedes, are disposed as in *Mursia armata;* the chelipedes and ambulatory legs, also, are nearly as in that species, but the palms of the chelipedes are externally more regularly granulated; and there are three subdistal spines on the outer surface of the merus-joint; the one nearest the upper margin of this joint is very small, and is usually obsolete in *Mursia armata*. Colour (in spirit) yellowish-brown, inclining to pink on the chelipedes; the apices of the dactyli of the ambulatory legs are brown-pink, and a patch of the same colour ornaments the inner surface of the palms of the chelipedes.

Adult ♀.	Lines.	Millims.
Length of carapace,	13½	29
Breadth of carapace,	16	34
Length of a chelipede, rather over	19	40·5
Length of second ambulatory leg,	22½	47·5

Fiji Islands, 315 fathoms, lat. 19° 9′ 35″ S., long. 179° 41′ 50″ E. Station 173 (an adult female).

Cryptosoma, Brullé.

Cryptosoma, Brullé, Crust. in Webb et Berthelot, Hist. Nat. des Iles Canaries, p. 16, 1836–1844.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 110, 1837.
Cyclöes, de Haan, Crust. in v. Siebold, Faun. Japonica, p. 68, 1837.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 391, 1852.

In this genus, which is nearly allied to the preceding, the carapace is always suborbiculate, with the postero-lateral margins slightly concave, the front in the middle line emarginate, the lateral spine very small or reduced to a mere tubercle. The subhepatic channels are less distinctly defined. The merus of the exterior maxillipedes is produced at the antero-internal angle into a small tooth or lobe above the carpal joint, which is

articulated near the antero-internal angle. The chelipedes (as in *Calappa*) are strongly developed; the ambulatory legs robust, with the joints dilated and compressed.

In the nearly allied genus, *Acanthocarpus*, Stimpson,[1] of which I have examined no specimens, the carapace as in *Cryptosoma* is not broader than long, and the merus of the outer maxillipedes (in the type) bears the next joint at its antero-internal angle. It is distinguished, according to the descriptions, by the extraordinarily developed carpal spine of the chelipede; but in the figures recently published by A. Milne Edwards, this spine is represented as originating from the merus-joint, and is apparently homologous with the smaller meral spine of *Mursia*.

Besides the species referred to below, *Cryptosoma granulosum* (de Haan, *Cyclöes*), Japan, and *Cryptosoma bairdii*, Stimpson, California, belong to this genus.

Cryptosoma cristatum (Leach).

Murcia cristata, Leach, MSS.
„ „ White (*Mursia*), List Crust. Brit. Mus., p. 45, 1847, not *Mursia cristata*, auctorum.
Cryptosoma cristatum, Brullé, Crust. in Webb et Berthelot, Hist. Nat. des Iles Canaries, pl. i. fig. 2, 1836–1844.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 110, 1837.
„ „ Lucas, Ann. Soc. Entom. France, ser. 6, vol. ii., Bulletin, p. cxv., 1882.
„ *dentatum*, Brullé, *tom. cit.*, p. 17, 1836–1844.

Cape Verdes, St. Vincent, July 1873. (Four males, adult and young, and a female.) The largest male has the following dimensions :—

Adult ♂.	Lines.	Millim.
Length of carapace, about	24½	52·5
Breadth of carapace, about	25½	54
Length of a chelipede,	32½	68·5

The ambulatory legs are imperfect.[2]

Family II. MATUTIDÆ.

Matutidæ, Dana, U. S. Explor. Exped., vol. xiii., Crust. 1, p. 390, 1852.

Characters of Calappidæ except as regards the exterior maxillipedes, whose endognath has the carpal and following joints concealed by the triangular acute merus-joint.

[1] *Bull. Mus. Comp. Zoöl.*, vol. ii. p. 153, 1870.

[2] The locality of Leach's type is "Africa" and not "Indian Ocean," as stated by White, *tom. cit.*, who substituted the latter mentioned for the original locality, both in the Register and Collection of the Museum, for what reason I know not. This species is recorded by Studer (*Abhandl. d. k. Akad. d. Wiss. Berlin*, p. 15, 1882), from Porto Praya, Cape Verde Islands, in 10 to 30 fathoms.

Subfamily 1. Hepatinæ.

Hepatinæ, Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 154, 1870.

Carapace somewhat cancroid in form, with the antero-lateral margins arcuated, the dactyli gressorial, not natatorial.

Genera:—*Hepatus*, Latreille; *Osachila*, Stimpson; *Actæomorpha*, Miers.

This subfamily is not represented in the Challenger collection.

Subfamily 2. Matutinæ.

Carapace usually suborbiculate; the dactyli of the eight posterior legs natatorial, *i.e.*, with the dactyli laminated and dilated.

Genus:—*Matuta*, Fabricius.

Matuta, Fabricius.

Matuta, Fabricius, Entom. Syst. Suppl., p. 369, 1798.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 113, 1837.
„ Miers, Trans. Linn. Soc. Lond. (Zool.), ser. 2, vol. i. p. 243, 1877.
„ de Man, Notes Leyden Mus., vol. iii. p. 109, 1881.

Carapace much depressed, and usually very slightly broader than long, with the antero-lateral margins slightly arcuated and irregularly dentated or tuberculated, and terminating in a strong acute lateral spine (which in *Matuta inermis* is reduced to a tubercle) placed at the junction of the antero-lateral and postero-lateral margins. Front narrow, about equalling the orbit in width, with a projecting median lobe, which is sometimes entire, sometimes notched. The dorsal surface is usually armed with six tubercles, placed, three in a median transverse series, one, anterior, on each side of the gastric, and one, posterior, on the cardiac region, and there is also usually a tubercle on the postero-lateral margin. The orbits are rather large, with a hiatus, communicating with an excavation on the subhepatic region, below the exterior orbital angle. Antennules nearly longitudinally plicated. Antennæ very small, and placed below the enlarged basal joint of the antennules, with the flagellum obsolete. The exterior maxillipedes cover the whole of the buccal cavity; their ischium-joint is distally truncated, the merus triangulate and distally subacute, and covers the following joints; the exognath is externally arcuated and reaches but little beyond the distal extremity of the ischium of the endognath. Chelipedes subequal, robust, and closely applicable to the body, with the merus trigonous, carpus externally slightly tuberculated, palm armed with spines or tuberculated ridges, fingers distally acute, the dactyl usually with a tuberculated or striated ridge on its exterior surface. Ambulatory legs of moderate length, with the joints compressed, the penultimate and terminal joints in all laminiform and dilated; in the fifth legs the dactyl is oval as in the Portunidæ.

The following species, besides those referred to below, are probably well established :—

Section A :—

Matuta lunaris (Herbst) = *Matuta planipes*, Fabricius (*fide* Hilgendorf), and *Matuta rubrolineata*, Miers, *Matuta leneifera*, Miers, var. Indian and Indo-Malaysian Seas; Pacific Ocean; Chefoo, Australia.

Matuta circulifera, Miers. Indo-Malaysian Seas. (Regarded by M. de Man as a variety of *Matuta lunaris*.)

Section B :—

Matuta granulosa, Miers. Oriental Seas; Amboina.

Matuta maculata, Miers. Chinese Seas; Panagatan Shoal.

Matuta picta, Hess (=*Matuta distinguenda*, Hoffman, and *Matuta obtusifrons*, Miers, var. ?). Indo-Pacific Seas.

Matuta victrix, Fabricius.

Cancer victor, Fabricius, Species Insect., ii. (Appendix) p. 502, 1781.
Matuta victor, Fabricius, Entom. Syst. Suppl., p. 369, 1798.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 115, pl. xx. figs. 3–6, 1837.
„ Hilgendorf, Monatsber d. k. preuss. Akad. d. Wiss. Berlin, p. 810, 1878.
victrix, Miers, Trans. Linn. Soc. Lond. (Zool.), ser. 2, vol. i. pt. v. p. 243, pl. xxxix. figs. 1–3, 1877, et synonyma.
„ „ de Man, Notes Leyden Mus., iii. p. 110, 1881.

Philippine Islands, Samboangan, 10 to 20 fathoms. Two males, and an adult and a sterile female.

Adult ♂.	Lines.	Millims.
Length of carapace,	19	40·5
Breadth of carapace, about	20½	43

Matuta victrix, var. *crebrepunctata*, Miers.

Matuta victrix, var. *crebrepunctata*, Miers, *tom. cit.*, p. 244, pl. xxxix. fig. 4, 1877, not synonym.

Ternate, October 15, 1874 (an adult male).

Adult ♂.	Lines.	Millims.
Length and breadth of carapace, about	15	31·5

Matuta banksii, Leach.

Matuta banksii, Leach, Zool. Miscell., vol. iii. p. 14, 1817 (?).
„ „ Miers, *tom. cit.*, p. 245, pl. xl. figs. 1, 2, 1877.
„ „ de Man, *tom. cit.*, p. 115, 1881.

Samboangan, Philippine Islands, 10 fathoms (two males and a female, with *Matuta victrix*).

The purple spots which cover the legs are fewer and larger than the spots on the carapace, and the penultimate joints and dactyli of the first, third, and fourth ambulatory legs are marked with a large purple blotch in the two males, but not in the female.

The striations of the dactylus of the mobile finger of the chelipedes are nearly obsolete.

Adult ♂.	Lines.	Millims.
Length and breadth of carapace,	12½	26·5

Matuta lævidactyla, Miers.

Matuta lunaris, Miers, *tom. cit.*, p. 247, pl. xl. figs. 10, 11, 1877; *nec Cancer lunaris*, Herbst.
„ *lævidactyla*, Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. v. p. 316, 1880.

Port Jackson, 3 fathoms (a small male).

Its dimensions are as follows:—

	Lines.	Millims.
Length of carapace,	7	15
Breadth of carapace, nearly	7	14·5
Length of a chelipede,	6	12·5

In this specimen the striated ridge of the outer surface of the dactyl of the chelipede is obsolete, and this joint is externally smooth. The series of tubercles on the outer margin of the palm is parallel (nearly) with the lower margin. The front is distinctly notched, and (the specimen being of small size) all the tubercles of the dorsal surface of the carapace are distinct.

Matuta inermis, Miers.

Matuta inermis, Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 256, pl. xxvi. fig. C, 1882.

Torres Strait, 6 fathoms, in lat. 10° 36′ 0″ S., long. 141° 55′ 0″ E. (Station 187). An adult female and three smaller males are in the collection.

The female is of much larger size than the type of the species described in the above report, having the following dimensions:—

Adult ♀.	Lines.	Millims.
Length of carapace, nearly	16	33·5
Breadth of carapace, nearly	15	31·5
Length of a chelipede, nearly	14	29·5
Length of second ambulatory leg,	22	46·5

The colour (in spirit) is yellowish-brown, purple on the anterior part of the carapace, sides of the branchial regions, and the dactyli of the fifth ambulatory legs.

Family III. LEUCOSIIDÆ.

Leucosiens, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 118, 1837.
Leucosiidæ, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 390, 1852.

Afferent channels to the branchiæ opening at the antero-lateral angles of the palate and not behind the pterygostomian regions. The carpal and following joints of the endognath of the exterior maxillipedes are wholly concealed by the triangulate merus-joint. (The intromittent sexual appendages in the male are exserted from the sternum.)

The genera of this family are numerous, and vary remarkably in the form of the carapace and chelipedes. No satisfactory classification of them has been proposed. I have thought it advisable to establish only two subfamilies, one of which (Leucosiinæ) is restricted to the single genus *Leucosia*, Fabricius, but it may be found preferable hereafter to separate this genus more definitely under a primary section, and to regard some or all of the sectional divisions of the subfamily Iliinæ as distinct subfamilies.

Subfamily 1. ILIINÆ.

The anterior frontal region of the carapace is not narrowed and produced anteriorly. No thoracic sinus is developed.

Section I. The carapace is laterally produced and expanded, so as to cover in great part the ambulatory legs. The palms of the chelipedes are moderately robust; the fingers compressed, not filiform (Oreophorinæ).

Genera:—*Oreophorus*, Rüppell; *Spelæophorus*, A. Milne Edwards; *Tlos*, Adams and White; *Cryptocnemus*, Stimpson; *Uhlias*, Stimpson.

This section is not represented in the Challenger collection.

Section II. The carapace is not produced over the bases of the ambulatory legs. The palms of the chelipedes are short and turgid; the fingers elongated, very slender or filiform, incurved at the apices, and armed on the interior margins with spinuliform teeth (Myrodinæ).

Genera:—*Myrodes*, Bell; *Nursilia*, Bell; *Iphiculus*, Adams and White.

Myrodes, Bell.

Myrodes, Bell, Trans. Linn. Soc. Lond. (Zool.), vol. xxi. p. 299, 1855.

This genus only differs from *Myra* (with which it is united by A. Milne Edwards and Haswell) in the form of the chelipedes, whose palms are much shorter than the fingers, and turgid, ovoid or subglobose; the fingers are elongated and very slender; strongly incurved at the tips and armed with spinuliform teeth, some of which are more elongated, so that the fingers are rostelliform. This remarkable peculiarity in the

structure of the chela, which occurs with more or less distinctness in certain other genera (*e.g.*, *Nursilia*, *Iphiculus* and *Callidactylus*), is, I think, sufficient to distinguish *Myrodes* from (both) *Myra* and *Persephona*.

From *Nursilia* and *Iphiculus*, *Myrodes* is at once distinguished by a very different form of the carapace, which in those genera has not the three posterior tubercles which exist in Myrodes. *Callidactylus*, Stimpson, is less certainly distinguishable from *Myrodes*; it differs, however, according to Dr. Stimpson, in the absence of an indurated ridge from the basal joint of the antennules (which ridge is not very distinctly developed in *Myrodes*), in the somewhat contorted palms of the chelipedes, and in the character of the dactyli of the ambulatory legs.

The type of this genus, *Myrodes eudactylus*, occurs in the Indo-Malaysian and Australian Seas, and at New Caledonia.

Myrodes eudactylus, Bell.

Myra dilatimanus, White, List Crust. Brit. Mus., p. 46, 1847, *descrip. nullâ*.
Myrodes eudactylus, Bell, Trans. Linn. Soc. Lond., *tom. cit.*, p. 299, pl. xxxii. fig. 6, 1855; Cat. Leucosiidæ in Brit. Mus., p. 13, 1855.
Myra eudactyla, A. Milne Edwards, Nouv. Archiv. Mus. Hist. Nat., vol. x. p. 46, pl. iii. fig. 3, 1874.
„ „ Haswell, Cat. Australian Crust., p. 123, 1884.
Myrodes gigas, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 52, pl. v. fig. 5, 1880.

South of New Guinea, 28 fathoms (Station 188) a small, perhaps young, specimen.

In this example the carapace is somewhat broader in proportion to its length, and the lobes of the rostrum less prominent than in the specimens from the Philippines in the collection of the British (Natural History) Museum. The dorsal surface is indistinctly carinated in the median line, as in two out of three specimens in that collection. There is no granulated border on the inner margin of the palm of the chelipede in any specimen I have examined of this species, and Bell's figure is probably in error as regards this particular.

♀.	Lines.	Millims.
Length of carapace, about	6½	14
Breadth of carapace,	5½	11·5

Section III. The carapace is not produced over the bases of the ambulatory legs. The palms of the chelipedes are very slender and elongated; the fingers very slender and nearly straight, or with the tips slightly incurved. The pterygostomian channels have usually two notches at the distal extremity (Iliinæ, Stimpson).

Genera:—*Ilia*, Fabricius; *Arcania*, Leach (=*Iphis*, Leach); *Ixa*, Leach; *Iliacantha*, Stimpson; *Myropsis*, Stimpson; *Callidactylus*, Stimpson (this genus establishes the transition to the section Myrodinæ).

Arcania, Leach.

Arcania, Leach, Zool. Miscell., vol. iii. p. 19, 1817.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 133, 1837.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 392, 1852.
„ Bell, Trans. Linn. Soc. Lond. (Zool.), vol. xxi. p. 309, 1855.
Iphis, Leach, Zool. Miscell., vol. iii. p. 19, 1817.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 138, 1837.
„ Dana, *tom. cit.*, p. 392, 1852.
„ Bell, *tom. cit.*, p. 311, 1855.

Carapace convex, subglobose, or somewhat rhomboidal, with the dorsal surface tuberculated, granulated or spinuliferous; the lateral and posterior margins nearly always armed with spines. Front usually rather prominent and bilobed. Orbits (as usual) with three marginal fissures and a rather wide interior hiatus; the interior subocular angle usually spiniform. The post-abdomen in the male is narrow, with two or three of the intermediate segments coalescent. Eyes small. Antennules obliquely plicated. Antennæ with a slender basal joint, which does not fill the interior orbital hiatus; flagellum moderately developed. The merus of the endognath of the exterior maxillipedes is usually much shorter than the ischium, and is often only subacute at the distal extremity; the exterior margin of the exognath is straight. The chelipedes (in the adult males) are slender and somewhat elongated, and, as usual in this subfamily, the merus is subcylindrical, and the palm slender and somewhat swollen at the base; the fingers open in a vertical plane and are armed with minute teeth, some of which are spinuliform. Ambulatory legs slender and somewhat elongated, with the dactyli styliform.

The species occur throughout the Indo-Pacific region in shallow or moderately deep water.

To the species enumerated by Bell are to be added:—

Arcania globata, Stimpson. Seas of China and Japan (16 to 25 fathoms).

Arcania orientalis, Miers. Japan, 30 to 36 fathoms. (This species is intermediate between this genus and *Ebalia*.)

Arcania novem-spinosa, Adams and White, var. *aspera*, Miers. Malaysian Seas.[1]

[1] I have proposed the name *Arcania duodecimspinosa* for a specimen from the Seychelles (4 to 12 fathoms), of whose specific distinctness I am somewhat uncertain, on account of its very small size. *Arcania granulosa*, Miers, from Moreton Bay, is, as I have elsewhere noted, probably identical with *Arcania undecimspinosa*, de Haan, and *Arcania pulcherrima*, Haswell, with *Arcania septemspinosa*, Bell, but as the latter name is preoccupied by Fabricius and Leach for *Arcania* (*Iphis*) *septemspinosus*, Haswell's name may be conveniently used to designate Bell's species.

Arcania septemspinosa (Fabricius).

Cancer septemspinosus, Fabricius, Mantissa Insectorum, vol. i. p. 325, 1787.
Iphis septemspinosa, Leach, Zool. Miscell., vol. iii. p. 25, 1817.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 139, 1837; Atlas in Règne Animal de Cuvier, ed. 3, Crust., pl. xxv. fig. 4 (after Herbst).
„ „ Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 311, 1855; Cat. Leucosiidæ in Brit. Mus., p. 22, 1855.

Hong Kong, 10 fathoms (an adult and two younger females); Kobé, Japan, 8 to 10 fathoms (a small female); and at Station 233B, in lat. 34° 18′ 0″ N., long. 133° 35′ 0″ E., 15 fathoms (a young female and two rather small males).

The largest male measures as follows :—

♂.	Lines.	Millims.
Length of carapace, nearly	7	14·5
Breadth of carapace, nearly	6½	13·5

The genus *Iphis*, which is retained as distinct from *Arcania*, both by Milne Edwards and Bell, differs merely in its slightly more rhomboidal carapace, and must, I think, be united with that genus.

Ixa, Leach.

Ixa, Leach, Trans. Linn. Soc. Lond., vol. xi. p. 334, 1815.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 134, 1837.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 392, 1852.
„ Bell, Trans. Linn. Soc. Lond. (Zool.), vol. xxi. p. 311, 1855.

Carapace transversely rhomboidal, or somewhat elliptical, and prolonged at the junction of the antero-lateral and postero-lateral margins into a cylindrical lobe, which often equals in length the transverse width of the carapace, and is rounded or tipped with a spinule at the distal extremity; the carapace is usually longitudinally divided into three parts by two wide fossæ, which border the cardiac, gastric, and hepatic regions, and thence are continued over the pterygostomian regions to the bases of the chelipedes, but these fossæ are sometimes obsolete. The front projects but slightly, and is anteriorly concave; the orbits have three marginal fissures and a rather wide interior hiatus. The endostomian ridges are strongly defined, and the channels exterior to them, communicating with the branchial cavities, are emarginate at the distal extremity. The post-abdomen (in the male) covers the sternum at base, and is five-jointed, with three of the intermediate segments coalescent. Eyes small. Antennules slightly oblique. Antennæ with the basal joint very slender and not filling the interior hiatus of the orbit. The endognath of the exterior maxillipedes is narrow, with the ischium longitudinally sulcated, the merus triangulate; the exognath is broad, with the exterior margin straight; it is rounded at the distal extremity, and does not wholly cover the channel which communicates with the branchiæ. The chelipedes (in the male) are cylindrical and very

slender, almost filiform, with the merus and palm elongated; fingers slightly incurved at the tips and denticulated on the inner margins. The ambulatory legs are moderately elongated and very slender, with the dactyli styliform.

The four recent species described by authors are probably, as I have stated below, identical with *Ixa cylindrus*, Fabricius, which is probably distributed throughout the Indo-Pacific region from the Mauritius to the Philippines and Borneo, and also occurs in a fossil state in recent alluvial or perhaps quaternary deposits (*vide* A. Milne Edwards, Ann. Soc. Entom. France, p. 156, 1865).

Ixa cylindrus (Fabricius), var. *megaspis*.

Ixa megaspis, Adams and White, Crust. in Zool. H.M.S. "Samarang," p. 55, pl. xii. fig. 1, 1848.

Manila, 1 fathom (an adult male). Presented to Dr. Willemoes-Suhm by Mr. Baer.[1]

Iliacantha, Stimpson.

Iliacantha, Stimpson, Bull. Mus. Comp. Zoöl., vol. ii. p. 155, 1870.

Carapace convex, ovoid or subglobose, with the lateral margins arcuated, with a protuberance or tubercle upon the pterygostomian regions, and with three posterior lobes or spines, as in *Myra* and *Persephona*. The front (in the species I have examined) is narrow and anteriorly slightly concave, and the orbit has more or less distinct indications of three marginal fissures and a wide interior hiatus. Pterygostomian channels distally very strongly defined and bi-emarginate. Post-abdomen (in the young male) distinctly seven-jointed. Eyes small. Antennules (in the species I have examined) slightly oblique. Antennæ with a very slender basal antennal joint, which does not fill the interior orbital hiatus; flagellum of moderate length. Exterior maxillipedes with the ischium-

[1] The late Mr Bell, in his monograph of the Leucosiidæ (*Trans. Linn. Soc. Lond.* (Zool.), vol. xxi. p. 311, 1855), united all the then described species of *Ixa* under the common designation *Ixa cylindrus* (Fabricius). It is probable, indeed, that no characters can be discovered of sufficient value to separate three of these forms specifically, but it may be of service here to indicate the distinctions by which the specimens in the collection of the British (Natural History) Museum may be at present separated.

In that which I think to be the typical *Ixa cylindrus*, Fabricius (*Ixa canaliculata*, Leach) the median portion of the carapace (circumscribed by the deep and wide lateral and postfrontal channels), has its margins sinuated or notched; in the variety *megaspis*, Adams and White, they are entire, and in both the tubercles of the posterior margin are small or obsolete. A third (unnamed) variety, represented by a single female from the Philippines (Cuming) resembles *megaspis* in all particulars except that the later processes of the carapace are without the terminal spinule of that variety and *cylindrus*.

Ixa inermis, of Leach, with which I think *Ixa edwardsii* of Lucas (*Ann. Soc. Entom. France*, vol. vi. p. 179, pl. iv. fig. 3, 1858) to be identical, may be distinguished by the absence of the lateral and postfrontal channels of the carapace (which, however, are represented in the type of *inermis* by an impressed suture on either side of the cardiac region), by the large rounded tubercles of the posterior margin of the carapace, and by the somewhat distally-narrowed lateral processes of the carapace (which are without terminal spinules), and may with more probability be regarded as specifically distinct.

joint (in *Iliacantha intermedia*) longitudinally sulcated; merus as usual triangulate; exognath rather narrow, with the exterior margin straight. Chelipedes slender and rather long, with the merus subcylindrical and granulated; palm slender, narrowing distally and somewhat contorted, so that the fingers open vertically; the fingers (as in *Ilia*) are very slender, and are armed with fine, usually spinuliform, teeth. Ambulatory legs slender and of moderate length; tarsi styliform.

From *Ilia* this genus differs in having but three posterior spines on the carapace, and from *Myropsis* in that the fingers open in a vertical and not in a horizontal plane.

To the species described by Stimpson, *Iliacantha globosa* and *Iliacantha sparsa*, dredged in the Florida Straits in 30 to 60 fathoms, I have to add a third, *Iliacantha intermedia*, obtained by the Challenger Expedition at Bahia, in shallow water.

Iliacantha intermedia, n. sp. (Pl. XXVI. fig. 3).

This species is distinguished from the West-Indian *Iliacantha subglobosa*, Stimpson, and *Iliacantha sparsa*, Stimpson,[1] by the length of the dactyli of the chelipedes, which in *Iliacantha subglobosa* considerably exceed, but in *Iliacantha intermedia* do not attain the length of the palm, and by the form of the postero-lateral spines or teeth of the carapace, which in *Iliacantha intermedia* are flattened and triangulate; but in *Iliacantha sparsa* are similar in shape to, and more than half as long as, the posterior median spine.

The carapace is moderately convex, longer than broad, and is everywhere very distinctly and evenly granulated; the antero-lateral margins, at the hepatic regions, are bluntly angulated; at some distance behind the hepatic angle there is another slight angular projection, as in *Iliacantha subglobosa*. The median and posterior spine of the carapace is prominent and acute, and very slightly recurved at the distal extremity; the lateral spines or teeth are flattened and triangulate, and rounded at the apices. The front (as seen in a dorsal view), projects slightly beyond the eyes; it is concave above, truncated in front, with the anterior margin nearly straight. The orbits are small, without fissures in the upper margin; the endostome is strongly longitudinally ridged; the ridges define the lateral channels (pterygostomian channels of Stimpson), which terminate distally in three strong spiniform teeth. The sternum is evenly granulated; the post-abdomen (in the young male), has the segments, except the two first and the last, coalescent, and is granulated at and near the base. The ischium-joint of the endognath of the outer maxillipedes is longitudinally sulcated on its outer surface, which is nearly smooth; the merus-joint is triangulate, acute, much shorter than the ischium, and strongly granulated on the outer surface; the exognath is externally strongly granulated, with the exterior margin nearly straight; its rounded

[1] *Bull. Mus. Comp. Zoöl.*, vol. ii. pp. 155, 156, 1870.

distal extremity does not attain the apex of the merus-joint of the endognath. The chelipedes are very slender; the merus is nearly as long as the carapace, subcylindrical and granulated; carpus very short, smooth; palm shorter than the merus, smooth, and tapering distally; fingers little more than half as long as the palm, very slender, with the tips incurved and armed with several distant teeth, between which are smaller granuliform teeth. Ambulatory legs slender and moderately elongated, with the dactyli styliform and slightly longer than the penultimate joints. Colour (in spirit) light yellowish-brown.

♂.	Lines.	Millims.
Length of carapace and rostrum,	7½	15
Breadth of carapace, nearly	6½	13·5
Length of a chelipede,	14	30
Length of first ambulatory leg,	11	23·5

Bahia (shallow water), a sterile female.

Stimpson's description of *Iliacantha subglobosa* was also based on a sterile female; it is evident, therefore, that the difference in the length of the dactyli of the chelipedes is not a sexual character, and it would appear from his description that the carpus and palm of the chelipede in *Iliacantha subglobosa* are granulated, and the teeth of the dactyli more acute.

Section IV. The carapace is not produced so as to cover in great part the ambulatory legs. The chelipedes are robust, not slender; the palms and fingers compressed, not slender and elongated (Ebaliinæ, Stimpson, part).

Genera:—*Ebalia*, Leach (=*Bellidilia*, Kinahan, *Phlyxia*, Leach, subgenus); *Persephona*, Leach (=*Guia*, Milne Edwards); ?*Myra*, Leach; *Leucosilia*, Bell; *Randallia*, Stimpson; *Nucia*, Dana; *Lithadia*, Bell; *Carcinaspis*, Stimpson; *Merocryptus*, A. Milne Edwards; *Onychomorpha*, Stimpson; *Nursia*, Leach (in this genus the carapace is slightly produced over the bases of the legs); *Leucisca*, MacLeay; *Pseudophilyra*, Miers; *Philyra*, Leach.

Ebalia, Leach.

Ebalia, Leach, Zool. Miscell., vol. iii. p. 18, 1817.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 128, 1837.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. I, p. 392, 1852.
„ Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 303, 1855.
Phlyxia, Bell (subgenus), Trans. Linn. Soc. Lond., *tom. cit.*, p. 303, 1855.
Bellidilia, Kinahan, Journ. Roy. Dublin Soc., vol. i. p. 128, 1858.

Carapace transverse and often rather longer than broad, suborbiculate or subrhomboidal, with the dorsal surface moderately convex or depressed, uneven, tuberculated or

obscurely carinated; the front emarginated or subtruncated or quadridentated, the hepatic regions are usually concave; the lateral margins are entire or more or less distinctly tuberculated or toothed, but the tubercles are very rarely spiniform. The orbits are very small, circular, with two or three closed marginal fissures and an interior hiatus; the buccal cavity is not separated from the antennulary fossæ by any distinct epistoma, and the endostomian ridges are very stongly defined. The post-abdomen in the male is narrow and four or five-jointed, with several of the intermediate segments coalescent, and it covers the sternum at base, between the bases of the fifth ambulatory legs. Eyes very small. Antennulary fossæ oblique, or nearly transverse. The antennæ are very small and their basal joint enters the interior orbital hiatus. The exterior maxillipedes cover the whole of the buccal cavity; the merus of the endognath, as usual, is triangulate, and the exognath has a straight or somewhat curved exterior margin.

The chelipedes (in the male) are subequal and of moderate length, or more rarely, considerably elongated; with the merus subcylindrical or somewhat trigonous, palm and fingers usually compressed. The ambulatory legs are slender and small, with the joints usually smooth; dactyli styliform.

The species are small and numerous and inhabit the sublittoral or deeper waters both of the Atlantic and Indo-Pacific regions. The species of the section *Phlyxia*, Bell, are, as far as at present known, restricted to Australia.

From the genus *Nursia* (to which it is nearly allied), *Ebalia* differs in the less produced margins of the carapace, which are not cristated, &c.

The genera *Ebalia* and *Phlyxia* are now connected by so many intermediate species, that not one of the distinctive characters mentioned by Bell can be regarded as constant. I propose, therefore, to unite these genera, but to separate the species under two primary sections or subgenera (for which the names *Ebalia* and *Phlyxia* may conveniently be retained) as follows:—

I. Front slightly concave or truncated, not quadridentated (*Ebalia*[1]):—

Ebalia tuberosa (Pennant) = *Ebalia insignis*, Lucas, *fide* Heller. European Seas; Adriatic; Mediterranean, to 250 metres (Heller).

Ebalia tumefacta (Mont.) = *Ebalia aspera*, Costa, *fide* Heller. European Seas; Mediterranean; Adriatic.

Ebalia cranchii (Leach) = *Ebalia discrepans*, Costa, and *Ebalia deshayesii*, Lucas, *fide* Heller. European Seas; Mediterranean; Adriatic. This species and the preceding are mentioned by Heller to occur in 30 to 40 fathoms.

Ebalia granulosa, Milne Edwards. Mediterranean, Corfu (Coll. Brit. Mus.).

Ebalia edwardsii, Costa = *Ebalia algerica*, Lucas. Mediterranean.

[1] The synonyms of the Mediterranean species are as given by Dr. Heller, Crust. südlichen Europe, pp. 124–128, 1863.

Ebalia costæ, Heller. Adriatic. (Is probably a variety of *Ebalia granulosa*.)
Ebalia setubalensis, Capello = *Ebalia elegans*, Capello. Setubal.
Ebalia nux, Norman. Mediterranean, to 300 métres.
Ebalia maderensis, Stimpson. Madeira. (Is perhaps not distinct from *Ebalia tuberosa*.)
Ebalia fragifera, Miers. Canaries.
Ebalia tuberculata, Miers. Senegambia; Goree Island, to 15 fathoms.
Ebalia affinis, Miers. Senegambia; Goree Island, to 15 fathoms.
Ebalia stimpsonii, A. Milne Edwards. Barbados, to 50 fathoms.
Ebalia granulata (Rüppell). Red Sea; Providence Group, to 24 fathoms.
Ebalia orientalis, Kossmann. Red Sea.
Ebalia tuberculosa (A. Milne Edwards). South Africa; Agulhas Bank, to 150 fathoms; East and South Australia; New Zealand, to 150 fathoms.
Ebalia lambriformis (Bell) = *Phlyxia petleyi*, Haswell. North, East, and South Australia; south of New Guinea, to 28 fathoms.
Ebalia lævis (Bell). New Zealand Seas, to 150 fathoms.
Ebalia erosa (A. Milne Edwards). Bass Strait; New Caledonia.
Ebalia quadrata (A. Milne Edwards). Bass Strait. (Perhaps a species of *Nursia*.)
Ebalia granulosa (Haswell). Sydney Heads, "deep water."
Ebalia minor, Miers. Japanese Seas.
Ebalia bituberculata, Miers. Japanese Seas, to 52 fathoms.
Ebalia rhomboidalis, Miers. Japanese Seas.
Ebalia pulchella, A. Milne Edwards. Fiji Islands.
Ebalia miliaris, A. Milne Edwards. Samoan Islands, Upolu. (Perhaps a distinct genus.)

II. Front with four distinct (usually tuberculiform) lobes or teeth, including the tooth at the interior angle of the orbit. (*Phlyxia*.)

Ebalia crassipes (Bell). South and East Australia (to 40 fathoms).
Ebalia quadridentata, Gray, with var. *spinifera*, nov. Australia, Port Jackson.
Ebalia spinosa (Kinahan). Australia, Port Philip.
Ebalia spinosa, var. *orbicularis* (Haswell) = *Bellidilia serratocostis*, Kinahan (?). East and South Australia (to 15 fathoms); Tasmania.
Ebalia ramsayi (Haswell). Port Jackson.
Ebalia dentifrons, n. sp. South Australian Coast.
Ebalia intermedia, n. sp. South Australia, near Port Philip (38 fathoms).[1]

[1] The *Ebalia spinosa*, A. Milne Edwards, from Upolu, is perhaps referable to the genus *Arcania*.

Ebalia lambriformis (Bell).

Phlyxia lambriformis, Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 304, pl. xxxiv. fig. 2, 1855.
„ „ Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 252, 1884, et synonyma.

South of New Guinea, 28 fathoms, in lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E., Station 188 (an adult female).

Adult ♀.	Lines.	Millims.
Length of carapace, ...	5½	11·5
Breadth of carapace, rather over	5	11

This species, in the form of the carapace and in other characters, resembles somewhat the genus *Nursia*.

Ebalia lævis (Bell).

Phlyxia lævis, Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 305, pl. xxxiv. fig. 3, 1855; Cat. Leucosiidæ in Brit. Mus., p. 18, 1855.
„ „ Miers, Cat. New Zealand Crust, p. 56, 1876.

New Zealand Seas, not far from South Island, lat. 39° 32′ 0″ S., long. 171° 48′ 0″ E., in 150 fathoms, Station 167 (two adult males); Queen Charlotte Sound, near Long Island, 10 fathoms, Station 167A (two adult females).

The deep-water specimens in the Challenger collection do not differ appreciably from the shallow-water examples of the species I have examined, except in the somewhat more elongated merus-joints of the chelipedes. One of them has the following dimensions:—

Adult ♂.	Lines.	Millims.
Length and breadth of carapace, about	5	10·5
Length of a chelipede, about	13	27·5
Length of first ambulatory leg, nearly	7½	15·5

Ebalia tuberculosa (A. Milne Edwards) (Pl. XXV. fig. 1).

Persephona tuberculosa, A. Milne Edwards, Journ. des Mus. Godeffroy, vol. i. Heft iv. p. 86, 1873.
„ „ Haswell, Cat. Australian Crust., p. 132, 1882.
? *Phlyxia granulosa*, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 54, pl. vi. fig. 3, 1880; Cat. Australian Crust., p. 126, 1882.

Port Jackson, 30 to 35 fathoms (three females); off Twofold Bay, 150 fathoms, Station 163A (two small females); Bass Strait, off East Moncœur Island, 38 fathoms, Station 162 (several specimens, males and females); New Zealand Seas, off South Island, in 150 fathoms, Station 167 (numerous specimens, mostly adult males).

A fully-grown male has the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace,	5	10·5
Breadth of carapace, about	4½	10
Length of a chelipede,	12½	26·5
Length of ambulatory leg,	7	15

The specimens dredged near New Zealand, in deep-water (Station 167), are generally of larger size, and in most, but not all of them, the tubercles of the gastric and branchial regions are less prominent and the chelipedes are more developed than in the specimens from Australian localities.

In small females the two rounded protuberances of the posterior margin are not developed, and the margin is straight.

There are in the collection three small females from the Agulhas Bank, 150 fathoms, lat. 35° 4′ 0″ S., long. 18° 37′ 0″ E. (Station 142), which cannot, I think, be distinguished specifically from *Ebalia tuberculosa*.[1]

Ebalia (*Phlyxia*) *crassipes* (Bell).

Phlyxia crassipes, Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 304, pl. xxxiv. fig. 2, 1855; Cat. Leucosiidæ in Brit. Mus., p. 17, 1855.
„ „ Miers, Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 252, 1884.

Specimens of this, which is perhaps the commonest species of the subgenus (or genus) *Phlyxia* were obtained at the following localities:—

Port Jackson (Sow and Pig's Bank), 6 fathoms, a good series of specimens; also at Port Jackson, 8 to 15 fathoms (an adult male), and 30 to 35 fathoms (two adult males); also several males and females dredged off the South Australian coast in 2 to 10 fathoms, in April 1874; and several specimens from East Moncœur Island, Bass Strait, 38 fathoms (Station 162).

In the adult males the chelipedes are often very considerably elongated; one in the Challenger series from Port Jackson (30 to 35 fathoms) presents the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace,	5½	11·5
Breadth of carapace, about	5	11
Length of a chelipede, over	12	26
Length of first ambulatory leg,	7½	16

The carapace is always more or less distinctly tuberculated on the dorsal surface, with greyish or fuscous markings, which exist also on the chelipedes.

[1] *Ebalia tuberculosa* is connected through *Ebalia fragifera*, Miers (*Ann. and Mag. Nat. Hist.*, vol. viii. p. 268, 1881), with *Ebalia tuberculata*, and certain other Atlantic and European forms. *Ebalia fragifera* is, however, distinguished from *Ebalia tuberculosa* by the deeply concave hepatic regions of the carapace, the less prominent front, and the fewer granules of the palms of the chelipedes. The Mascarene (Providence Island) specimen referred by me to *Ebalia granulata*, Rüppell, differs somewhat in the broader carapace, less prominent front, &c.

Ebalia (*Phlyxia*) *intermedia*, n. sp. (Pl. XXV. fig. 2).

I thus very doubtfully designate some small specimens (perhaps not fully grown) which are intermediate in their distinctive characters between *Phlyxia crassipes* and *Phlyxia orbicularis*. They are distinguished from the former species by the absence of tubercles from the dorsal surface of the carapace (except sometimes an obscure tubercle in front of the median posterior spine, which is more elongated than in *Phlyxia crassipes*) and from *Phlyxia orbicularis* by the more convex and less orbiculate carapace, more prominent front, and more slender chelipedes. It may be a variety of the latter species; it can hardly, I think, be identified with *Bellidilia serratocostis*, Kinahan, which is very briefly diagnosed.

Carapace moderately convex, longer than broad, granulated but not tuberculated on the dorsal surface, which is somewhat uneven, with a slight protuberance on the intestinal region, in front of the posterior spine, and with three or four small tubercles or granules on the lateral margins, the most prominent being one placed in the middle of the postero-lateral margin; front rather prominent and quadridentated; the median posterior spine of the carapace is prominent and acute, and below it the posterior margin is straight, with the lateral angles not prolonged as lateral spines. There is a small tubercle on each pterygostomian region. The sternum and post-abdomen are finely granulated; the latter is smooth, with all of the segments (except the last) coalescent in the male; in the (young ?) female one or two of the basal segments are partially distinct; the terminal segment is narrow and rounded at the distal extremity. The maxillipedes are finely granulated; the exognath has a nearly straight outer margin, and its distal extremity nearly attains the acute apex of the merus of the endognath. The chelipedes are moderately elongated and slender; merus slightly compressed (but not carinated) and granulated, the granules of the posterior surface most prominent; wrist and palm granulated and compressed; the latter has on its exterior margin a small indentation at base close to its articulation with the wrist; fingers thin, compressed, as long as or slightly longer than the palm, and obscurely denticulated on their inner margins near to the apices, which are incurved; ambulatory legs, of which only one or two detached, remain very slender, with the dactyli styliform and considerably longer than the penultimate joints. Colour, in spirit, light yellowish-brown. The most perfect specimen, which is, I think, an immature female, has the following dimensions :—

♀.	Lines.	Millims.
Length of carapace, nearly	4	8
Breadth of carapace,	3½	7·5
Length of a chelipede, about	6	13
Length of first ambulatory leg, nearly	5	10·5

Four small specimens, all more or less imperfect, were dredged in 33 fathoms, off the entrance to Port Philip (Station 161).

Ebalia (*Phlyxia*) *undecimspinosa* (Kinahan), var. *orbicularis*.

? *Bellidilia serratocostis*, Kinahan, Journ. Roy. Dublin Soc., vol. i. p. 1[illegible],
? „ *undecimspinosa*, Kinahan, *tom. cit.*, p. 128, pl. iii. fig. 2, 1858, var.
Phlyxia orbicularis, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 54, pl. vi. fig. 2. 1880; Cat. Australian Crust., p. 125, 1882.

Port Jackson (Sow and Pig's Bank), 6 fathoms, 8 to 15 fathoms (two adult females), 8 fathoms (an adult male and female); South Australian Coast, 2 to 10 fathoms, April 1874 (numerous specimens).

The largest male presents the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace, rather over	11½	24·5
Breadth of carapace, rather less than	11½	24
Length of a chelipede,	27½	58
Length of first ambulatory leg, about	15	32

Although commonly occurring with *Phlyxia crassipes*, this is a perfectly distinct species, characterised by the less prominent front and the absence of tubercles from the gastric and branchial regions of the carapace, which has, besides the three prominent posterior tubercles, only some smaller ones upon the lateral margins, and occasionally two or three upon the median longitudinal carina; the fuscous markings, characteristic of *Phlyxia crassipes*, do not exist in the specimens of *Phlyxia orbicularis* I have examined. It also attains a larger size than *Phlyxia crassipes*, and has a more depressed and more regularly orbiculate carapace.[1]

Ebalia (*Phlyxia*) *quadridentata*, Gray, var. *spinifera* (Pl. XXV. fig. 3).

? *Ebalia quadridentata*, Gray, Zool. Miscell., vol. ii. p. 40, 1831.
? *Phlyxia quadridentata*, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 160, 1858.

Phlyxia quadridentata is only known to me by the very short and insufficient diagnosis of the late Dr. Gray, which, as regards the tubercles of the dorsal surface of the carapace, does not accurately apply to any species of this genus.

It is not improbable that the Challenger specimen, of which a description follows, may belong to a distinct species.

Carapace moderately convex, rather longer than broad, covered with small granules and with larger granules (or small spiniform tubercles) which are disposed as follows:—three in a triangle on the gastric region, one on the cardiac region, one or two on each

[1] I refer to this species under Haswell's name, *Phlyxia orbicularis*, because Kinahan's *Bellidilia serratocostis* is so briefly characterised, that its identification with *Phlyxia orbicularis* must remain uncertain, and I am unable to discover the Tasmanian type specimen, which, according to Kinahan, existed in the collection of the British Museum. *Bellidilia undecimspinosa*, Kinahan, differs from all specimens I have seen in possessing an additional tooth on each postero-lateral margin, and should (I think) be regarded at least as a distinct variety.

branchial region, one on the hepatic and pterygostomian regions, and three or four on the lateral margins; and with a posterior median spine, on either side of which is a smaller triangulate lobe or tooth. The front is prominent, and is quadridentated, the lateral somewhat stouter but not more prominent than the median teeth, which are separated by a deeper fissure than that between the median and lateral teeth. The orbits have three deep fissures as in other species of the genus. The surface of the sternum and post-abdomen is minutely granulated, the post-abdomen without tubercles, and with all of the segments except the last coalescent, but with indications of the suture defining the basal segment, and with a protuberance at base on each side of the compound segment. The maxillipedes are covered with prominent granules, similar to those of the carapace; their exognathi have a nearly straight outer margin and attain nearly to the distal extremity of the merus of the endognath. The chelipedes are moderately elongated and slender; merus subcylindrical and granulated, the granules of the posterior surface larger than the others; carpus short, palm compressed but scarcely carinated, both carpus and palm are granulated on their exterior margins; fingers about as long as the palm, compressed and crossed at the tips, with scarcely any indications of denticules on the inner margins. Ambulatory legs very slender; dactyli longer than the penultimate joints. Colour (in spirit) light yellowish-brown.

The single specimen has the following dimensions :—

♂.	Lines.	Millims.
Length to base of posterior spine, about	3	6·5
Breadth of carapace, rather under	3	6
Length of a chelipede, about	5	11
Length of first ambulatory leg, about	3½	7·5

and was dredged at Port Jackson (Sow and Pig's Bank), in 6 fathoms.

In the arrangement of the tubercles of the dorsal surface of the carapace and in other points this form nearly resembles *Ebalia granulosa*,[1] dredged, according to Haswell, by H.M.S. Challenger, outside of Sidney Heads in deep water; the latter, however, differs in the bidentate front, carinated palms of the chelipedes, &c., and has not the prominent median posterior spine which exists in *Phlyxia quadridentata* (?), var. *spinifera*.

Ebalia (*Phlyxia*) *dentifrons*, n. sp. (Pl. XXV. fig. 4).

The carapace is longer than broad, and moderately convex; it is covered, both above and below, with close-set prominent granules; its dorsal surface is very uneven, having several rounded prominences separated by marked intervening depressions; of these, one (very prominent) is situated on each hepatic region, one on each branchial region, and one on each intestinal region. The lateral margins bear, on each side, four small spines

[1] *Phlyxia granulosa*, Haswell, *Proc. Linn. Soc. N.S.W.*, vol. iv. p. 55, pl. vi. fig. 3, 1880; Cat. Australian sessile-eyed Crust., p. 126, 1882.

or teeth, three of which are placed midway between the front and posterior margin, and one near the postero-lateral margin; the front is prominent and truncated, and four-toothed, the teeth separated by nearly equal notches; there is also a tooth at the exterior angle of the orbit. The post-abdomen (in the female) covers the whole of the sternal surface of the body between the bases of the legs, and has all of the segments, except the two first and the last, coalescent; the first and second segments are granulated; the terminal segment is narrow and deeply encased in a cavity of the sternum, which attains the bases of the outer maxillipedes. The maxillipedes are coarsely granulated, their exognathi robust, with a nearly straight outer margin, and rounded at the distal extremity, which does not quite attain the acute apex of the merus of the endognath. The chelipedes (in the female) are moderately elongated and closely granulated, but not so coarsely as the carapace, and the joints are without spines or teeth; the merus is sub-cylindrical; the palm is slightly compressed, but not carinated; fingers about as long as the palm, compressed, with the tips incurved, obscurely denticulated on their inner margins, and faintly longitudinally-sulcated on the sides. The ambulatory legs are slender, with the antepenultimate joints angulated; the penultimate joints slightly dilated and carinated on the superior and inferior margins, and shorter than the slender dactyli. Colour of carapace (in spirit) greyish or brownish; the legs paler.

The best-preserved specimen presents the following dimensions:—

Adult ♀.	Lines.	Millims.
Length of carapace,	5	10·5
Breadth of carapace, nearly	5	10
Length of a chelipede, rather over	5	11
Length of first ambulatory leg,	4½	9·5

Two females were dredged in 2 to 10 fathoms, in April 1874, on the South Australian coast.

The form, granulation, and spinulation of the carapace distinguishes this from any species with which I am acquainted.

Persephona, Leach.

Persephona, Leach, Zool. Miscell., vol. iii. pp. 18, 22, 1817.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 136, 1857.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 392, 1852.
„ Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 292, 1855.
Guia, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 127, 1837.

The characters separating this genus from *Myra* are very slight. *Persephona* is, in fact, scarcely distinguishable from *Myra*, except by the somewhat more depressed and orbiculate carapace, the more transversely plicated antennules, the much more robust chelipedes and ambulatory legs (the palms and fingers of the chelipedes being dilated

and compressed, except in *Persephona lichtensteinei*), and the narrower exognath of the exterior maxillipedes, whose exterior margin is straight, not arcuated, and slightly dilated at base, as in *Myra*. The post-abdomen of the male in *Persephona punctata* (the only species in which I have examined it) is five-jointed, with the penultimate, as well as the first and second and terminal segments distinct.

This genus apparently represents *Myra* on the shores of the American continent and islands adjacent.[1]

Persephona punctata (Browne) (Pl. XXV. fig. 5).

Cancer punctatus, Browne, Civil and Nat. Hist. of Jamaica, vol. ii. p. 422, pl. xlii. fig. 3, 1756.
„ „ Linné (*partim*), Syst. Nat., ed. xii. p. 1045, 1766.
Persephona guaia, Bell, Trans. Linn. Soc. Lond., *tom. cit.*, p. 292, 1855.
„ *punctata*, Stimpson. Ann. Lyc. Nat. Hist. New York, vol. vii. p. 70, 1860.
„ „ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 403, 1879, et synonyma.

Bahia (shallow water), a small male.

♂.	Lines.	Millims.
Length of carapace, about	11	23·5
Breadth of carapace, about	10	21

The characteristic coloration is in this specimen almost obliterated.

Myra, Leach.

Myra, Leach, Zool. Miscell., vol. iii. pp. 19, 23, 1817.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 125, 1837.
„ Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 392, 1852.
„ Bell, Trans. Linn. Soc. Lond. (Zool.), vol. xxi. p. 296, 1855.

Carapace dorsally very convex, and more or less distinctly granulated, with the lateral margins regularly arcuated; it has three posterior spines or protuberances (the median one being more elevated and situated on the posterior margin), and there is usually a more or less distinct protuberance upon the pterygostomian regions. The front is concave and does not project beyond the anterior margin of the buccal cavity. The orbits are very small and circular, with usually three deep marginal fissures, and with a rather large inferior hiatus. The post-abdomen (in the male) is usually four-jointed, with all of the segments except the first, second, and last, coalescent. Eyes very small. Antennules somewhat obliquely plicated. Antennæ with a slender basal

[1] Its range may, however, extend over the whole Atlantic region; since there is a specimen, perhaps not distinct from *Persephona punctata*, from South Africa (Sir A. Smith), in the collection of the British (Natural History) Museum, and if the habitat of Herbst's *Cancer mediterraneus* be correctly given, this genus must also occur in the Mediterranean Sea. I have referred the species from Bass Strait, described by Dr. A. Milne Edwards as *Persephona tuberculosa*, to the genus *Ebalia*.

antennal joint, which scarcely attains or does not attain the front. The exterior maxillipedes cover the buccal cavity, and the merus of the endognath, as usual in this family, is triangulate and acute; the exognath is rather broad, about as broad as the endognath, and its exterior margin is slightly arcuated. The chelipedes (in the adult males) are subequal, and sometimes considerably elongated; the merus subcylindrical, and sometimes exceeding the carapace in length; palm subcylindrical or compressed, not dilated; fingers rather robust, compressed, and distally acute; the ambulatory legs are relatively small, with the dactyli styliform.

The species are found in the Indo-Malaysian, Japanese and Australian Seas, in littoral or shallow water; one species at least (*Myra fugax*) occurs commonly throughout the Indo-Pacific region.

Besides the different forms regarded as synonyms of *Myra fugax* and *Myra australis*, Haswell, and *Myra darnleyensis*, Haswell, referred to below, I am not aware that any recent species have been described since the publication of Professor Bell's Monograph.

Myra fugax (Fabricius).

⁇ *Cancer cuphæus*, Linné, Mus. Lud. Ulricæ, p. 440, 1764; Syst. Nat., ed. xii. p. 1045, 1766.
? „ *punctatus*, Herbst, Naturgesch. der Krabben u. Krebse, vol. i. p. 89, pl. ii. figs. 15, 16, 1782, *nec* Linn.
Leucosia fugax, Fabricius, Entom. Syst. Suppl., p. 351, 1798.
Myra fugax, Leach, Zool. Miscell., vol. iii. p. 24, 1817.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 126, 1837; Crust. in Cuvier, Règne Animal, vol. xxv. fig. 3.
„ „ Bell, Trans. Linn. Soc. Lond., *tom. cit.*, p. 296, 1855; Cat. Leucosiidæ in Brit. Mus., p. 12, 1855.
? „ „ de Haan, Crust. in v. Siebold, Fauna Japonica, decas. v. p. 134, pl. xxxiii. fig. 1, 1841, ♂ adult.
„ *carinata*, Bell, Trans. Linn. Soc. Lond., *tom. cit.*, p. 297, pl. xxxii. fig. 3, 1855; Cat. Leucosiidæ, in Brit. Mus. p. 13, 1855.
„ „ Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. v. p. 316, 1880; Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 250, 1884, young.
? „ *subgranulata*, Kossmann, Malacostraca in Zool. Ergebn. einer Reise Küstengeb. d. rothen Meeres, p. 65, pl. i. fig. 7, 1877.
„ „ *cf.*, Hilgendorf, Monatsber. d. k. preuss. Akad. d. Wiss. Berlin, p. 811, 1878.
? „ *punctata*, Hilgendorf, *tom. cit.*, p. 811, 1878.
„ *coalita*, Hilgendorf, *tom. cit.*, p. 812, pl. i. figs. 6, 7, 1878, var. (?).
„ *dubia*, Miers, Proc. Zool. Soc. Lond., p. 42, 1879, var. (?).

Arafura Sea, south of New Guinea, 28 fathoms (Station 188), an adult and smaller male, and an adult and two younger females; also in 49 fathoms (Station 190), in lat. 8° 56′ 0″ S., long. 136° 5′ 0″ E., a young male.

[1] The genus *Myrodes*, Bell, which is united by Haswell in his Catalogue of the Australian Crustacea, 1882, with *Myra* should, I think, be retained as distinct.

The largest male of the Challenger series, from Station 138, presents the following dimensions :—

Adult ♂.	Lines.	Millims.
Length of carapace, about	13	28
Breadth of carapace, about	11	23·5
Length of a chelipede, nearly	34	72
Length of first ambulatory leg, ...	15½	33

The smallest specimen (male) from the same locality measures as follows :—

Young ♂.	Lines.	Millims.
Length of carapace, ...	8	17
Breadth of carapace, nearly	7	14·5
Length of a chelipede, ...	14½	31
Length of first ambulatory leg, ...	8½	18

The examination of the Challenger series compels me to unite, under the designation *Myra fugax*, several species which I have hitherto supposed to be distinct. In young specimens the carapace is more or less distinctly carinated in the median dorsal line, and the post-abdomen in the male is flat and smooth, without the subbasal prominences and the tubercle which sometimes exists on the penultimate segment in adult examples; the margins of the carapace also are more distinctly granulated, and the chelipedes relatively shorter. In adult males the chelipedes are sometimes very considerably elongated (as in the figure of de Haan cited above) and—in specimens I have examined in the collection of the British (Natural History) Museum—the three posterior spines of the carapace strongly developed and acute; perhaps these may be referable to a distinct variety or species; the chelipedes, however, are usually more slender and more elongated in adult males than in adult females.[1]

[1] I may note in regard to the synonymical citations, that the *Cancer cuphæus* of Linné was founded on a specimen wanting the chelipedes, and cannot therefore be identified with certainty with any species of this genus. *Cancer punctatus*, Herbst, resembles *Myra fugax* in the form of the body and limbs, but differs in coloration from any specimen I have examined. Hilgendorf, who refers (*tom. cit.*) to the type, adds no information regarding it. The form I have described, from Japanese types (*Proc. Zool. Soc. Lond.*, p. 42, 1879), as *Myra dubia*, is probably identical with *Myra coalita*, Hilgendorf, described in the preceding year (*Monatsber. d. k. preuss. Akad. d. Wiss. Berlin*, p. 812, pl. i. figs. 6, 7, 1878), from Zanzibar, and may be a variety of *Myra fugax*, although the types are distinguished from all specimens of that species I have seen by possessing a tubercle on the intestinal region in front of the median spine of the posterior margin. They are probably not fully grown. A similar tubercle was observed by Hilgendorf in specimens referred to *Myra fugax*.

Myra affinis, Bell.

Myra affinis, Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 296, pl. xxxii. fig. 2, 1855; Cat. Leucosiidæ in Brit. Mus., p. 12, 1855.
" " Haswell, Cat. Australian Crust., p. 122, 1882.

Torres Strait, August 1874, a young female.

♀.	Lines.	Millims.
Length of carapace,	8	17
Breadth of carapace, nearly	7	14·5
Length of a chelipede, nearly	12	25
Length of first ambulatory leg, nearly	7	14·5

This specimen has the median longitudinal line of granules on the dorsal surface of the carapace which is usually found in young specimens of species of this genus.

This form is very nearly allied to *Myra mammillaris*, Bell, but is apparently distinguishable by the less convex and rounded tubercles of the posterior margin of the carapace, the median one being more elongated and acute, and the two lateral ones more triangulate than in *Myra mammillaris*. Young specimens are to be distinguished from *Myra australis*, Haswell (which they much resemble), by the somewhat narrower carapace and by the less numerous but more prominent granulations of the maxillipedes and the adjacent parts of the body.

Myra australis, Haswell.

Myra mammillaris (yg.), Miers, Trans. Linn. Soc. Lond., ser. 2, *tom. cit.*, p. 239, pl. xxxviii. figs. 25–27, 1877.
Myra australis, Haswell, Proc. Linn. Soc. N.S.W., *tom. cit.*, p. 50, pl. v. fig. 3, 1880; Cat. Australian Crust., p. 122, 1882.

Torres Strait, in lat. 10° 36′ 0″ S., long. 141° 55′ 0″ E., 6 fathoms (Station 187), a male.[1]

♂.	Lines.	Millims.
Length of carapace,	8	17
Breadth of carapace,	7	15

Myra darnleyensis, Haswell.

? *Myra darnleyensis*, Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 52, pl. v. fig. 4, 1880; Cat. Australian Crust., p. 122, 1882.

Carapace (as in other species of the genus) convex and rather longer than broad; it is rather closely and finely granulated over the whole of the dorsal surface; there is a

[1] The specimens in the collection of the British (Natural History) Museum, designated "*M. mammillaris*, yg." vary slightly in the prominence of the intestinal region and of the posterior median spine, and the abdomen in the figure should have been represented with the sides slightly concave.

slight prominence upon the hepatic regions, and beneath this the sides of the carapace at the pterygostomian regions are slightly convex but scarcely angulated; the three tubercles of the posterior margin are placed nearly in the same horizontal line; they are slightly compressed and nearly semicircularly rounded or slightly triangulate. The front is deeply concave above with the lateral lobes prominent. The three sulci in the upper and latter orbital margins are deep and distinct. The post-abdomen (in both sexes) has some scattered punctulations; in the male, all of the segments, except the first and last, in the female, the third to sixth segments, are coalescent; the terminal segment in the male is narrow and elongated, and the penultimate segment bears a small tubercle. The exterior maxillipedes are (as in *Myra mammillaris*) coarsely granulated distally; the exognath as in other species is arcuate externally, and it nearly attains the distal extremity of the merus of the endognath. The chelipedes (as in other species of the genus) are elongated; merus finely and closely granulated; palm compressed and rather short; fingers slender and elongated, longer than the palm, and meeting along their inner edges, which are denticulated, the tips incurved. The ambulatory legs are slender and short (as in other species of the genus). Colour (in spirit) light yellowish; the chelipedes (except the fingers) brownish-pink, carapace sometimes with markings of the same colour. The single male presents the following dimensions:—

Adult ♂.	Lines.	Millims.
Length of carapace and rostrum,	11½	24
Breadth of carapace, about	9½	20
Length of a chelipede,	25½	54
Length of first ambulatory leg,	15	32

Celebes Sea, 10 fathoms, in lat. 6° 54′ 0″ N., long. 122° 18′ 0″ E. (Station 212). An adult male and seven adult females.

The Challenger specimens are identified with *Myra darnleyensis* with some uncertainty, because, although agreeing with the description and figure of Haswell in what seem to be the essential characteristics of the species, wherein they also differ from others of the genus, *i.e.*, in the broad and compressed posterior tubercles of the carapace and the greatly elongated fingers of the chelipedes, they differ (it would appear) in the more prominent lobes of the front, the less prominent hepatic tubercle, and the non-granulated male abdomen. A figure is therefore given. The Challenger specimens are all larger than Haswell's type from Darnley Island.

Randallia, Stimpson.

Randallia, Stimpson, Journ. Boston Soc. Nat. Hist., vol. vi. p. 471, 1857.

Carapace convex, orbiculate, with the lateral margins regularly arcuated; the posterior margin armed with two lobes or teeth. The front projects but little, and its

anterior margin is concave. Orbits very small, subcircular, with two or three fissures. The post-abdomen in the male (in the species I have examined) is narrowed at the distal extremity, and at base it covers the whole width of the sternum, between the fifth ambulatory legs. Eyes small. Antennules obliquely plicated. The basal joint of the antennæ is well developed, but (in the species I have examined) does not attain the front. The exterior maxillipedes (in *Randallia granulata*) cover the whole of the buccal cavity; the triangulate merus-joint is but little produced at the distal extremity, the exognath is nearly as broad as the endognath, with the distal extremity rounded, the exterior margin straight. The chelipedes (in the males) are well developed; with the merus-joint subcylindrical, palm somewhat compressed, fingers compressed and distally acute; the ambulatory legs are moderately elongated, the joints not dilated, the dactyli styliform.

The type of this genus, *Randallia ornata* (Randall), is from Upper California.

Randallia granulata, n. sp. (Pl. XXVI. fig. 1).

The carapace is convex, as broad as or a little broader than long, very coarsely and evenly granulated; the granules larger upon the dorsal than upon the inferior parts of the body. The sulci defining the regions of the carapace are discernible in some places; the most distinct being the cardiaco-branchial sulci. There is no tooth or prominence upon the hepatic and pterygostomian regions, but the antero-lateral margins, behind the hepatic regions, are slightly indented. There are two small granulated lobes or prominences upon the posterior margin. The front (in a lateral view) does not project beyond the buccal cavity; it is deeply concave above (in a dorsal view), and therefore bilobate, with the lobes rounded. The orbits are very small, with two superior and an inferior fissure, and with a very distinct inner subocular hiatus. The epistoma is transverse and deeper on the sides than in the middle. The sternum is granulated, the segments of the post-abdomen, except the first, second, and last, are partially coalescent, but marked with distinct sulci indicating the sutures of the coalescent segments; the segments in the male are distinctly granulated, except the terminal segment, the sides are straight and converge from the base of the third to the terminal segment; the third segment is longest and bears two lateral rounded prominences; the penultimate segment has a small median tooth at its distal extremity, the terminal segment is narrow, nearly smooth and rounded distally. The antennulary fossettes are rather large and deep, and (as in Stimpson's description of *Randallia ornata*) the large basal joints of the antennules close the aperture which exists between the epistoma and front, the basal joint of the antennæ is larger than the following joints, but does not reach the front. The exterior maxillipedes are coarsely granulated; ischium of the endognath longer than the merus, with a smooth inner margin; merus obliquely truncated at the distal extremity; exognath robust, with a nearly straight outer margin, the distal extremity rounded and not quite

attaining the apex of the merus of the endognath. The chelipedes (in the adult) are robust and somewhat elongated; with the joints granulated but not carinated or toothed; merus (in the adult male) subcylindrical and nearly as long as the carapace; carpus a little shorter than the palm, which is more than half the length of the merus; fingers nearly as long as the palm, compressed, finely granulated, and scarcely toothed on the inner margins. Ambulatory legs slender and moderately elongated, with the dactyli styliform, hairy on the superior margins, and shorter than the penultimate joints. Colour (in spirit) light yellowish-brown.

Adult ♂.	Lines.	Millims.
Length and breadth of carapace, about	12½	26
Length of a chelipede,	24	51
Length of first ambulatory leg, about	16	33·5

Off Nukalofa, Tongatabu, 240 fathoms (Station 172A), an adult male; Fiji Islands, lat. 20° 56′ 0″ S., long. 175° 11′ 0″ W., 315 fathoms (Station 173), an adult female and three smaller males.

In the small males the terminal post-abdominal segment is as distinctly granulated as the others.

Lithadia, Bell.

Lithadia, Bell, Trans. Linn. Soc. Lond. (Zool.), vol. xxi. p. 305, 1855.

Of this genus I have examined but three specimens, referable to two species, *Lithadia cariosa*, Stimpson, var. and *Lithadia* (?) *sculpta*, Haswell, and I am unable, from the descriptions only, to indicate any constant characters by which it may be distinguished from *Ebalia*, except such as are derived from the carapace, which is very strongly granulated and more or less pitted, sulcated, and eroded on the dorsal surface, as in the genera *Oreophorus* and *Spelæophorus*; but in these genera the carapace is dilated at the postero-lateral margins, and more or less produced over the bases of the ambulatory legs. From *Actæomorpha*, Miers (perhaps = *Osachila*, Stimpson), it is distinguished by the form of the carapace, which in the typical species of *Actæomorpha* (*Actæomorpha erosa*) is cancroid in shape, with the antero-lateral margins regularly arcuated.

The following is, I believe, a complete list of the described species of this genus:—

Lithadia cumingii, Bell. Central America; Puerto Portrero (13 fathoms).
Lithadia cariosa, Stimpson. North Carolina, southward to Florida, Bahia (?).
Lithadia cadaverosa, Stimpson. West of Tortugas; Couch Reef (to 40 fathoms).
Lithadia pontifera, Stimpson. Barbados.
Lithadia cubensis, von Martens. Cuba.
Lithadia brasiliensis, von Martens. Brazil, Rio de Janeiro.

Lithadia lacunosa, Kingsley. Florida, Sarasota Bay.
Lithadia rotundata, A. Milne Edwards. Mouth of the Bermejo.
Lithadia granulosa, A. Milne Edwards. Santa Cruz (to 115 fathoms).
Lithadia (*?*) *sculpta*, Haswell. North-East Australia; Fitzroy Islands; Arafura Sea (to 36 fathoms).[1]

Lithadia cariosa, Stimpson, var. (?) (Pl. XXVI. fig. 2).

cf. Lithadia cariosa, Stimpson, Ann. Lyc. Nat. Hist. New York, vol. vii. p. 238, 1860.

A small male obtained at Bahia (shallow water) is in the collection, to which Stimpson's detailed description will apply in all points except the following:—The ridge connecting the front with the median protuberances of the carapace, and also the hepatic regions, are not very prominent and distinctly granulated, and these median protuberances are evenly granulated like the rest of the dorsal surface. The front is without a median fissure. The outer maxillipedes are evenly granulated, and the merus of the chelipedes has a series of more prominent granules on its posterior margin. The dactyli of the ambulatory limbs are indistinctly granulated. The unique specimen is of very small size. The distinctions above cited may prove to be of specific importance, but other specimens are needed for comparison in order to determine this point.

♂.	Lines.	Millims.
Length and breadth of carapace, about	3½	7·5
Length of a chelipede,	3¼	7
Length of first ambulatory leg,	3	6·5

I cannot identify this form with any of the other described species of this genus.

Merocryptus, A. Milne Edwards.

Merocryptus, A. Milne Edwards, Journ. Mus. Godeffroy, vol. iv. p. 85, 1873.

Carapace dorsally convex and uneven and tuberculated, somewhat rhomboidal, concave on the hepatic regions and on the postero-lateral parts of the branchial regions, and with the branchial regions prolonged at the junction of the antero-lateral and postero-lateral margins, the lobes thus formed somewhat cylindrical as in *Ixa*, but less considerably developed; posterior margin with two prominences, which are most developed in the males. Front concave or bilobated, and rather prominent. Orbits small, with the marginal fissures indistinctly indicated; the interior hiatus of moderate

[1] *Ebalia mammillosa*, Desbonne and Schramm, Crust. de la Guadeloupe, p. 54, belongs, according to Dr. Stimpson, to this genus; I have never been able to consult a copy of this work.

width. The channel defined by the endostomian ridges is not emarginated distally. Post-abdomen (in the male) narrow, and at base covering the sternum between the fifth ambulatory legs, with all the segments except the first and last coalescent. Antennules nearly transversely plicated. Antennæ with a rather slender basal joint which does not quite attain the front. The triangulate merus-joint of the endognath of the exterior maxillipedes is shorter than the ischium; the exognath is of moderate width, and its exterior margin is nearly straight. Chelipedes rather robust and short, and shaped nearly as in *Lithadia* and *Oreophorus*, with the merus granulated, palm rather short and turgid, fingers compressed and denticulated on the inner margins, but the denticles are not spinuliform. Ambulatory legs short and granulated, with the dactyli styliform and somewhat uncinated.

But a single species has as yet been recorded of this curious genus; *Merocryptus lambriformis*, A. Milne Edwards, whose types were from Upolu.

Merocryptus lambriformis, A. Milne Edwards.

Merocryptus lambriformis, A. Milne Edwards, Journ. Mus. Godeffroy, vol. i., Heft 4, p. 85, pl. ii. fig. 1, 1873.

Bass Straits, off East Moncœur Island, 38 fathoms (Station 162), several males and females; off Twofold Bay, 150 fathoms (Station 163A), two small males.

In the smaller males the gastric and cardiac prominences, and the tubercles of the posterior margin, are more prominent and acute than in the adult and fully-grown specimens.

The largest male measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace,	4½	9·5
Breadth of carapace, exclusive of lateral lobes, rather over	4	9

Philyra, Leach.

Philyra, Leach, Zool. Miscell., vol. iii. p. 18, 1817.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 131, 1837.
„ Bell, Trans. Linn. Soc. Lond. (Zool.), vol. xxi. p. 299, 1855.

This genus is nearly allied to *Leucosia*, but distinguished by the less convex carapace, which is usually granulated or punctulated, but not polished; by the broader front, which is not at all prominent, and usually slightly concave; by the absence of the *sinus thoracicus*, and by the form of the exognath of the exterior maxillipedes, which is usually much more dilated, and is rounded at the distal extremity, with the exterior margin arcuated.

The species are somewhat numerous and occur commonly in the littoral and shallow waters of the Indo-Pacific region.

To the species enumerated by Professor Bell the following must be added :—

Philyra variegata (Rüppell). Red Sea.
Philyra tuberculosa, Stimpson. Hong-Kong.
Philyra unidentata, Stimpson. Chinese Seas (to 30 fathoms).
Philyra marginata, A. Milne Edwards. Samoan Islands.
Philyra longimana, A. Milne Edwards. New Caledonia.
Philyra cristata, Miers. Goree Island.
Philyra lævidorsalis, Miers. Goree Island.
Philyra rectangularis, Miers. Seychelles.
Philyra rudis, Miers. Penang.

Leucosia orbicularis, Bell, should probably be referred to this genus; it differs from the typical *Leucosiæ* and resembles *Philyra* in the broader less prominent front, and the absence of the thoracic sinus, but resembles *Leucosia* and differs from *Philyra* in the polished carapace.

Philyra platycheira (?), de Haan.

1 *Philyra platycheira*, de Haan, Crust. in v. Siebold, Fauna Japonica, decas 5, p. 132, pl. xxxiii. fig. 6, 1841.
„ „ Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 300, 1855.

An adult female, obtained on the South Australian Coast in 2 to 10 fathoms, in April 1871, is referred, but rather doubtfully, to this species.

The pterygostomian regions are but very slightly angulated.

Adult ♀.	Lines.	Millims.
Length of carapace,	5	10·5
Breadth of carapace, rather over	4½	10
Length of a chelipede,	7½	16

Subfamily 2. Leucosiinæ.

The frontal region of the carapace is narrowed and produced anteriorly. A thoracic sinus is developed (*i.e.*, a shallow pit in front of and above the bases of the chelipedes).[1]

The subfamily is restricted to the single genus *Leucosia*, Fabricius.

[1] This curious cavity is not apparently connected with the respiratory chamber, as is the opening in front of the chelipedes in the families Calappidæ and Dorippidæ.

Leucosia, Fabricius.

Leucosia, Fabricius, Entom. Syst. Suppl., p. 349, 1798.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 121, 1837.
„ Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 281, 1855.

Carapace convex, semiglobose, smooth and usually polished, without tubercles or indications of the regions of the dorsal surface, the anterior part of the cervical region usually prominent, the front either triangulate, truncated, or with a median cusp. The antero-lateral margins defined by a granulated line, which may extend for a short distance along the postero-lateral margins; beneath the lateral margins is an excavated pit, defined in front of the bases of the chelipedes by a series of granules, and continued as a shallow excavation beneath the postero-lateral margins (*sinus thoracicus*, Bell). The post-abdomen in the male is large and covers the sternum at the base between the fifth ambulatory legs; the first and last segments are usually distinct, the remainder either consolidated or divided by a median suture. The eyes and orbits are extremely small; the orbits circular; the antennules are somewhat obliquely plicated; the minute antennæ are placed beneath the antennules; their basal joint does not attain the frontal margin and the small flagellum enters the interior hiatus of the orbit. The exterior maxillipedes completely cover the buccal cavity, the triangulate acute merus of the endognath covers the following joints; the exognath is distally obtuse and its exterior margin is straight or nearly so. Chelipedes in the adult male subequal, with the merus strongly granulated at its base and usually along the margins; carpus and palm usually granulated on the interior margins, palm compressed, fingers distally acute. Ambulatory legs rather small, with the joints unarmed, dactyli styliform and compressed.

The species of this well-known genus are numerous and are often remarkable for the beauty of their coloration; they occur commonly in the littoral and shallower waters of the Indo-Pacific region.

Besides the species described or adverted to by myself in the memoir above alluded to, the following have been described since the publication of Mr. Bell's monograph:—

Leucosia splendida, Haswell. Port Jackson.
Leucosia leslii, Haswell. Torres Strait (Darnley Island);

and two new species, *Leucosia australiensis* and *Leucosia haswelli*, are described below.[1]

Leucosia australiensis, n. sp. (Pl. XXVII. fig. 1).

The carapace is convex, smooth, and has a few scattered punctulations, which are absent from the parts near to the posterior and postero-lateral margins. The antero-

[1] The species described by Haswell as *Leucosia cheverti* is probably, as I have shown, identical with *Leucosia whitei*, Bell. I have also described a new variety of the common *Leucosia craniolaris*, *lævimana* (Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 250, pl. xxvi. fig. A) from the Torres Strait. The variety *viridimaculata*, Haswell, of *Leucosia reticulata*, Miers, is not sustained by Mr. Haswell in his Catalogue of the Australian Crustacea, 1882.

lateral margins are bordered with a line of granules, which are largest above the bases of the chelipedes; this line terminates just behind the chelipedes; the posterior margin is bordered by a minutely granulated line, which is prolonged on each side beneath the postero-lateral margins above the bases of the ambulatory legs. The hepatic region is slightly convex, and in front of it, and behind the front, the sides of the carapace are deeply concave. The front is prominent and somewhat triangulate. The post-abdomen (in the male) is narrow, and is divided in the middle line by a suture (where also its margins are notched), and by two others defining the small basal and terminal segments; in the (sterile) female the sutures defining the second, third, and fourth segments are more or less distinctly indicated. The form of the thoracic sinus will be best understood by a reference to the figure (fig. 1*a*); the lobe which partially defines it in front is granulated on the margin, and contains a series of small tubercles. The exognath of the outer maxillipedes does not attain the distal extremity of the merus-joint of the endognath, and both it and the merus-joint are distally granulated on the outer surface. The chelipedes (of the male) are of moderate length; the merus is granulated near to the base and along the margins nearly as in *Leucosia ocellata;* the wrist is smooth; the palm is also smooth, somewhat compressed, with the margins neither granulated nor carinated; fingers about as long as the palm, slender, obscurely toothed on the distal half of the inner margins, and with the apices incurved. Ambulatory legs slender and smooth, with the penultimate joints compressed and carinated above; dactyli longer than the penultimate joints. Ground colour greyish or yellowish, with three white spots on either side of the gastric region of the carapace, which are more or less distinctly annulated with orange, and with a pair of circles of the same colour on the back of the branchial regions and an orange-coloured spot on each postero-lateral margin. The bases of the fingers of the chelipedes and the joints of the ambulatory legs are banded with the same colour. The larger specimen (the female) has the following dimensions :—

♀.	Lines.	Millims.
Length of carapace and rostrum,	9½	20
Breadth of carapace, rather over	8	17·5
Length of a chelipede, nearly	9	18·5

Port Jackson, 3 fathoms (a sterile female); South Australian Coast, 2 to 10 fathoms (a male).

This species is most nearly allied to *Leucosia neocaledonica*, A. Milne Edwards,[1] and *Leucosia splendida*, Haswell,[2] which also was discovered at Port Jackson; from both of these species it is distinguished by the coloration and by the absence of a line of granules from the inner margin of the palms of the chelipedes.[3]

[1] *Nouv. Archiv. Mus. Hist. Nat.*, vol. x. p. 40, pl. ii. fig. 1, 1874.

[2] *Proc. Linn. Soc. N.S.W.*, vol. iv. p. 47, pl. v. fig. 1, 1879, and Catalogue, p. 119, 1882.

[3] I may note here, that not only *Leucosia neocaledonica*, A. Milne Edwards, but also *Leucosia longifrons*, de Haan, and *Leucosia pulcherrima*, Miers, are regarded by Dr. J. G. de Man as mere synonyms of *Leucosia urania*, Herbst (*cf.*, *Notes Leyden Mus.*, vol. iii. p. 123, 1881).

Leucosia haswelli, n. sp. (Pl. XXVII. fig. 2).

The carapace is shaped nearly as in *Leucosia reticulata*, Miers, to which this species is nearly allied, *i.e.*, it is rounded above, convex, smooth and polished, somewhat rhomboidal, with a prominent front whose anterior margin is straight or very obscurely sinuated, not dentated or emarginated; its upper surface is covered with scattered punctulations which are most abundant on the anterior part; its sides are bordered by a granulated line which extends along the antero-lateral margins and terminates on the postero-lateral margins, just above the bases of the first ambulatory legs; the posterior margin also is defined by a line of smaller granules, which is prolonged along the sides of the body above the bases of the ambulatory legs, and terminates behind the chelipedes. The thoracic sinus is shaped as in *Leucosia reticulata*, and, as in that species, contains several flattened tubercles. The eyes, antennæ, and maxillipedes present nothing remarkable; the rounded prominence which is observable on the ischium of the outer maxillipedes in *Leucosia reticulata* is not developed, or is very obscurely indicated, in *Leucosia haswelli*. As in *Leucosia reticulata*, the merus of the chelipedes is tuberculated in its proximal half, and the tubercles are, as in that species, crowded at the base and extend along the anterior and posterior margins to the distal extremity; the palm too is compressed, granulated on its inner, and slightly carinated on its exterior margin, as in *Leucosia reticulata*. The ambulatory legs (as usual in the genus) are slender, feeble and compressed, with the penultimate joints carinated above. Coloration, greenish or yellowish, with a large spot of a darker green on the back of each branchial region, and with two white spots on each side of the gastric region; the tubercles of the upper surface of the merus-joints of the chelipedes in one specimen are crimson-red; the ambulatory legs in both are yellowish.

The largest example (a sterile female) is somewhat distorted, and has the following dimensions :—

♀.	Lines.	Millims.
Length of carapace and front, nearly	12	25
Breadth of carapace (allowing for its distortion), nearly	11	23
Length of a chelipede, nearly	11½	24
Length of first ambulatory leg,	9½	20

Arafura Sea, south of New Guinea, in 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (Station 188), an adult female; Celebes Sea, in 10 fathoms, lat. 6° 54′ 0″ N., long. 122° 18′ 0″ E. (Station 212), a sterile female.

This species in all of its characters nearly resembles *Leucosia reticulata*, Miers,[1] from West Australia, from which it is distinguished not only by the different disposition of the markings of the carapace, which more nearly resemble those of *Leucosia pallida*,

[1] *Trans. Linn. Soc. Lond.* (Zool.) ser. 2, vol. i. p. 237, pl. xxxviii. figs. 13–15, 1877.

Bell, but also by the absence of the group of hepatic tubercles, which form so conspicuous an ornament of *Leucosia reticulata*.

Leucosia ocellata, Bell.

Leucosia ocellata, Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 289, pl. xxxi. fig. 5, 1855; Cat. Leucosiidæ in Brit. Mus., p. 8, 1855.
Haswell, Cat. Australian Crust., p. 118, 1882.

Arafura Sea, south of New Guinea, 28 fathoms (Station 188), two adult males and a female.

In addition to the four ocellated red spots of the gastric region mentioned by Bell as characteristic of this species, there are, I may add, two obscure yellowish-brown spots on the back of each branchial region. These are always very faintly indicated.

An adult male measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	9½	19·5
Breadth of carapace,	8	17

Leucosia whitei, Bell.

Leucosia whitei, Bell, Trans. Linn. Soc. Lond., vol. xxi. p. 289, pl. xxxi. fig. 2, 1855.
„ „ Haswell, Cat. Australian Crust., p. 118, 1882.

Arafura Sea, south of New Guinea, 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E., (Station 188), an adult male.

Adult ♂.	Lines.	Millims.
Length of carapace, nearly	6	12·5
Breadth of carapace,	5½	11·5

Leucosia craniolaris (Linné) (Pl. XXVII. fig. 3).

? *Cancer craniolaris*, Linné, Mus. Lud. Ulricæ, p. 431, 1764; Syst. Nat., ed. xii. p. 1041, 1766.
„ „ Herbst, Naturgesch. der Krabben u. Krebse, vol. i. p. 90, pl. ii. fig. 17, 1782.
Leucosia craniolaris, Fabricius, Entom. Syst. Suppl., p. 350, 1798.
„ „ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 122, 1837.
„ „ Bell, Trans. Linn. Soc. Lond., *tom. cit.*, p. 283, 1855.
„ „ var. *lævimana*, Miers, Crust. in Zool. Coll. H.M.S. "Alert," p. 250, pl. xxvi. fig. A, 1884.

Specimens are in the collection from the following localities:—

Arafura Sea, south of New Guinea, 28 fathoms, lat. 9° 59′ 0″ S., long. 139° 42′ 0″ E. (Station 188), two small females; and 49 fathoms, lat. 8° 56′ 0″ S.,

long. 136° 5′ 0″ E. (Station 190), a small female; also Kobé, Japan, 50 fathoms, two males, and Hong Kong, 10 fathoms, a fully grown female and smaller male. This, which is the largest male, measures as follows :—

Adult ♂.	Lines.	Millims.
Length of carapace, about	7½	15·5
Breadth of carapace, ...	6	13

In the smaller examples of this species the lateral lobes of the front are sometimes obsolete, as in the form described by de Haan as *Leucosia rhomboidalis*, which may be a variety of *Leucosia craniolaris*, though perhaps distinguishable by the form of the thoracic sinus.

Family IV. DORIPPIDÆ.

Dorippiens, Milne Edwards (pt.), Hist. Nat. Crust., vol. ii. p. 151, 1837.
Dorippidæ, Dana, U.S. Explor. Exped., vol. xiii., Crust. 1, p. 390, 1882.

The afferent channels to the branchiæ open (normally) behind the pterygostomian regions and in front of the chelipedes; the carpal and following joints of the endognath of the exterior maxillipedes are not concealed by the merus-joint. The two to four posterior legs are short and feeble, and raised on the dorsal surface of the carapace, as in many *Anomura*. (The sexual appendages in the male are exserted from the sternum.)

Genera :—*Dorippe*, Fabricius; *Ethusa*, Roux (subgenus *Ethusina*, Smith); ? *Cymopolia*, Roux; *Corycodus*, A. Milne Edwards; ? *Cyclodorippe*, A. Milne Edwards; *Cymonomus*, A. Milne Edwards; *Cymopolus*, A. Milne Edwards; ? *Tymolus*, Stimpson.

This family is not very extensively represented in the Challenger collection, and as I have examined no specimens of the genus *Tymolus*, or of the new genera recently characterised by A. Milne Edwards, I will not attempt to separate the genera under subfamilies or sectional headings.

The genus *Cymopolia*, as I have noted below, is related in many points to the Catometopa. *Cyclodorippe*, A. Milne Edwards, should probably be regarded as the type of a distinct subfamily, since there are no openings communicating with the branchiæ in front of the chelipedes (in this character this genus establishes the transition to the Leucosiidæ).

Dorippe, Fabricius.

Dorippe, Fabricius, Entom. Syst. Suppl., p. 361, 1798.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 154, 1837.

Carapace very much depressed on the dorsal surface and usually broader than long; narrowest in front, and widening to the postero-lateral margins of the branchial regions; the front is narrow and concave anteriorly; the interior supraocular angles of the large orbits are produced as a lobe or tooth, and there is a stronger spine at the exterior orbital angle; they are somewhat incompletely defined below. There is no epistoma, the buccal cavity being narrowed anteriorly and produced between the antennulary fossæ to the front. The post-abdomen (in the male) is distinctly seven-jointed. Eyes well developed. The long and nearly vertically plicated antennules are not capable of being retracted within the antennulary fossettes. The basal antennal joint is short and moderately robust, and occupies the interior hiatus of the orbit; the flagellum is well developed. The exterior maxillipedes do not cover the anterior part of the buccal cavity; the ischium of the endognath is produced at its antero-internal angle; the merus is narrow, shorter than the ischium, and bears the next joint at its antero-internal angle; the exognath is rather narrow and shorter than the endognath. The chelipedes (in the male) are moderately developed and rather large, subequal or unequal, with the merus trigonous; palm moderately compressed (sometimes the palm of one chelipede is considerably enlarged); fingers with regular obtuse denticles on the interior margins, and distally acute. The ambulatory legs of the first and second pairs are very considerably elongated, with the dactyli slender, elongated, and slightly falcated; those of the third and fourth pairs are very slender, short; the last pair raised above the preceding, and both subprehensile, *i.e.*, terminating in a short, slightly arcuate dactylus, which is reflexible against the short penultimate joint.

The species occur both in the Mediterranean, the West Atlantic, and the Indo-Pacific region, in moderately deep water.

The following are species which have been described since the publication of Milne Edwards's work:—

Dorippe japonica, v. Siebold. Japan (8 to 50 fathoms); Shanghai.
Dorippe granulata, de Haan. Japan (to 30 fathoms); Hong Kong.
Dorippe sexdentata, Stimpson. Japan (to 30 fathoms).
Dorippe armata, White (ined.), Miers. West Africa, Senegambia (to 15 fathoms).
Dorippe australiensis, Miers. North-East and East Australia.[1]

[1] As I have already noted (Crust. in Rep. Zool. Coll. H.M.S. "Alert," p. 257, 1884), the common Indo-Pacific species designated by Milne Edwards *Dorippe quadridentata*, is probably the *Cancer dorsipes* of Linné.

Dorippe facchino (Herbst).

Cancer facchino, Herbst (pt.), Naturgesch. der Krabben u. Krebse, vol. i. p. 190, pl. xi. fig. 68, 1782.
Dorippa sima, Milne Edwards, Hist. Nat. Crust., vol. ii. p. 157, pl. xx. fig. 11, 1837.
„ *facchino*, de Haan, Crust. in v. Siebold, Fauna Japonica, p. 123, 1841.
„ „ Stimpson, Proc. Acad. Nat. Sci. Philad., p. 163, 1858.

Hong Kong, 10 fathoms (an adult male).

Adult ♂.	Lines.	Millims.
Length of carapace,	11	23·5
Breadth of carapace,	13	27·5

The chelipedes in this specimen are small, subequal, and not robust.[1]

Dorippe japonica, v. Siebold.

Dorippa japonica, v. Siebold, Spicilegia, Fauna Japonica, p. 14, 1824.
„ „ de Haan, Crust. in v. Siebold, Fauna Japonica, p. 122, pl. xxxi. fig. 1 (*Dorippe callida*, Fabricius, on plate), 1841.

Japan, Kobé (8 to 15 fathoms), an adult male.

This specimen has the following dimensions:—

	Lines.	Millims.
Length of carapace, nearly	8	16·5
Breadth of carapace,	8	16·5
Length of a chelipede,	8	17
Length of first ambulatory leg,	25½	54

The branchial regions are convex, the right and left chelipedes are similar in form and development.

Ethusa, Roux.

Ethusa, Roux, Crust. de la Mediterranée, pl. xviii., 1828, text not paged.
„ Milne Edwards, Hist. Nat. Crust., vol. ii. p. 161, 1837.
Ethusina, Smith, subgenus (?), Ann. Rep. Com. Fish and Fisheries, 1882, p. 349, 1844.

Carapace depressed, subquadrilateral, and usually much longer than broad; the cervical and cardiaco-branchial sutures distinctly defined. Front bilobated, the lobes divided by a deep median sinus, and each terminating in two spines, one of which is the interior orbital spine; there is also a spine at the exterior orbital angle. Orbits rather large and shallow, incompletely defined, with the superior margin deeply sinuated or emarginated. The buccal cavity is rather abruptly narrowed and triangulate towards the distal extremity. The post-abdomen (in the male) is usually distinctly seven-jointed.

[1] *Dorippe sima*, Milne Edwards, is, as de Haan has pointed out (Crust. in v. Siebold, Fauna Japonica, p. 123), almost certainly identical with the crab figured by Herbst as *Cancer facchino*. But Herbst says in his description of this species, wherein he correctly distinguishes between it and the Mediterranean *Dorippe lanata*, "Man findet sie sowohl am mittelländische Meere, als an den Ost-Indischen Küsten," and there is a specimen purporting, though upon no reliable authority, to have been obtained in the Mediterranean, in the collection of the Museum.

The eye-peduncles are sometimes short, but in the typical species they extend beyond the level of the orbits. The exterior maxillipedes do not cover the anterior part of the buccal cavity; the ischium of the endognath is slightly produced at its antero-internal angle, the merus is much shorter than the ischium and distally truncated or subtruncated, with the antero-external angle rounded, and bears the next joint at its antero-internal angle; the endognath is slender. Chelipedes (in the male) either equal or unequal, and of moderate size; with the merus-joint trigonous or subcylindrical, the palm compressed, and sometimes one or the other dilated, the fingers distally acute, and scarcely toothed on the inner margins. The ambulatory legs of the first two pairs are elongated and rather slender; the dactyli styliform and slightly arcuated; those of the last two pairs, as in *Dorippe*, are short and feeble, and the last pair is raised above the preceding, they are subprehensile and terminate in a very short curved claw.

The species of this genus are not numerous and are the forms which evince the greatest degree of degradation from the Brachyuran type; there are also among them forms which inhabit the deepest abysses of the ocean. The species known to me are the following:—

Ethusa mascarone, Roux. Mediterranean (to 445 metres, A. Milne Edwards). Canaries; Senegambia.

Ethusa americana, A. Milne Edwards. West Florida (to 20 fathoms).

Ethusa microphthalma, Smith. South Coast of New England (to 156 fathoms); Azores (1000 fathoms).

Ethusa orientalis, n. sp. Fiji Islands (310 fathoms).

Ethusa (*Ethusina*) *abyssicola*, Smith. East Coast of United States (to 1735 fathoms).

Ethusa (*Ethusina*) *sinuatifrons*, n. sp. Japan Seas (to 1875 fathoms).

Ethusa (*Ethusina*) *gracilipes*, n. sp. Philippines (to 700 fathoms); Arafura Sea (to 800 fathoms), var. *robusta*, nov.[1]

Ethusa microphthalma, Smith.

Ethusa microphthalma, Smith, Proc. U.S. Nat. Mus., vol. iii. p. 418, 1881; vol. vi. p. 22, 1883, published 1884.

Azores 1000 fathoms, in lat. 38° 30′ 0″ N., long. 31° 14′ 0″ W. (Station 73). A small female.

♀.	Lines.	Millims.
Length of carapace,	3½	7·5
Breadth of carapace, about	3	6·5

[1] Professor S. I. Smith (*Proc. U.S. Nat. Mus.*, vol. iii. p. 419, 1881) refers to a species, *Ethusa sexdentata*, from Japan. I am unacquainted with this form unless by it be intended the species briefly described by Stimpson as *Dorippe sexdentata*. *Ethusa granulata*, Norman, has been recently referred by A. Milne Edwards to a distinct genus (*Cynomomus*).

The carapace in this specimen is a little longer than broad; the single chelipede remaining is very slender. In all particulars this specimen agrees very closely with the description of S. I. Smith.

Ethusa orientalis, n. sp. (Pl. XXVIII. fig. 1).

Carapace slightly longer than broad, depressed, everywhere granulated, on the dorsal and inferior surface, with the cervical and cardiaco-branchial sutures strongly defined. The front is divided by a triangulate median sinus into two lobes, each of which is tipped with two spines, so that the front is quadrispinose, and there is a strong triangulate tooth or lobe at the exterior orbital angle, which projects forwards to a level with the frontal teeth; the lateral margins of the carapace are straight and converge slightly to the front as in other species of the genus. There is no distinct epistoma. The post-abdomen (in the male) is distinctly seven-jointed; the terminal segment triangulate and subacute. The eye-peduncles are subcylindrical and small. The bases of the antennules are moderately dilated, and are not armed with distal spinules. The basal joint of the antennæ is slender, and although more elongated than in some other species does not attain the front. The exterior maxillipedes are granulated and are shaped as in other species of the genus, *i.e.*, the ischium of the endognath is slightly produced at its antero-internal angle and the merus is rounded at the antero-internal angle and obliquely truncated along the antero-internal margin; the exognath is very slender. The chelipedes (in the male) are either subequal or unequal, smooth, with the merus very obscurely trigonous, carpus short, the larger palm somewhat dilated and compressed, and rather longer than the fingers, which are distally acute and not denticulated on the inner margins; the palm of the smaller chelipede (or of both chelipedes in one specimen) are very slender, not thicker than the wrist. The legs of the second and third pairs are moderately robust and elongated, but less slender than in the species of the subgenus *Ethusina*, the dactyli are but very little longer than the penultimate joints; those of the fourth and fifth pairs are short and moderately robust, with very small dactyli.

Both the specimens are unfortunately very imperfect.

Two male specimens were collected at the Fiji Islands, in 310 fathoms, Station 173A, in lat. 19° 9′ 32″ S., long. 179° 41′ 55″ E.

The specimen with unequal chelipedes, which is slightly smaller than the other, measures as follows:—

Adult ♂.	Lines.	Millims.
Length of carapace,	7½	16
Breadth of carapace, about	7	15
Length of larger chelipede,	11½	24
Length of third leg,	23½	49·5
Length of fourth leg,	8½	18

The larger male differs not only in the small subequal chelipedes, but also in the form of the post-abdomen, which is slightly broader in proportion to its length.

Ethusina, Smith.

Ethusina, Smith, Ann. Rep. Com. of Fish and Fisheries, 1882, p. 349, 1884.

This genus (or subgenus as I prefer to regard it) is, according to Smith, closely allied to *Ethusa*, but is distinguished by the form of the antennules, whose basal segments are very large and swollen, occupy the whole width of the front, and crowd back the eyes and antennæ into an almost transverse position, nearly beneath the exterior orbital angles, which are reduced to small lateral teeth, far back from the front. The eye-stalks are very small and immovably imbedded in the orbits, which closely inclose them to near the tips, except for a narrow space beneath.

In the typical species *Ethusina abyssicola*, Smith, dredged off the east coast of the United States (1497 to 1735 fathoms), there are, according to Professor Smith, no podobranchiæ at the bases of the first gnathopods, so that there are only six branchiæ on each side; two arthrobranchiæ each at the base of the second gnathopod and first pereiopod, and one pleurobranchia each for the second and third pereiopods.

There are in the collection of H.M.S. Challenger two species, which on account of the structure of the antennules and eye-peduncles I assign to this genus. One of these species is unfortunately represented only by a single mutilated example.

Ethusa (*Ethusina*) *challengeri*, n. sp. (Pl. XXVIII. fig. 2).

Carapace about as broad as long, depressed above, with the cervical and cardiacobranchial sutures very indistinctly defined; the lateral margins nearly straight, and converging to the front, so that the body, as in *Ethusina abyssicola*, is much narrower in front than posteriorly. The front is not quadridentated, but sinuated, and concave in the middle line, where it is prolonged downwards (as in *Ethusina abyssicola*) between the bases of the antennules, and is in contact with the narrow median process of the epistoma. The orbits are very incompletely defined, and the exterior orbital spine or tooth, which is developed on one side only, is very short. The post-abdomen (in the female) is distinctly seven-jointed. The eye-peduncles are short, and taper from the bases to the distal extremity; the eyes are small, and terminal. The bases of the antennules are very large and swollen, subglobose. The basal joint of the antennæ is short and slender, and does not nearly attain the front (the flagellum is broken in the specimen examined). The exterior maxillipedes do not cover the anterior part of the buccal cavity, which is narrowed very abruptly (as in *Ethusina abyssicola*); the ischium is produced and rounded at its antero-internal angle. The merus is distally somewhat rounded, and is

obliquely truncated along its antero-internal margin; the exognath is very slender and does not attain the distal extremity of the merus of the endognath. The chelipedes (in the female) are subequal and slender; with the merus-joint but very obscurely trigonous; carpus very small, unarmed; palm short, slightly compressed, rounded above and below; fingers compressed, acute, and not denticulated on the inner margins. The legs of the second and third pairs are slender, with the joints subcylindrical; the dactylus (a single one only remains loosely attached to the third left ambulatory leg) is slightly curved, and rather longer than the penultimate joint. The legs of the fourth and fifth pairs are very slender and subcylindrical, much shorter than the preceding, and terminate in a small dactylus which is shorter than the penultimate joint. The body and limbs are scantily clothed with a very short close greyish pubescence.

♀.	Lines.	Millims.
Length and breadth of carapace, about	6	12·5
Length of a chelipede, nearly	9	18·5
Length of third left ambulatory leg,	20½	43·5
Length of fourth ambulatory leg, about	7½	16

The single specimen, which is a female, probably adult, was taken at Station 237, in 1875 fathoms, lat. 34° 37′ 0″ N., long. 140° 32′ 0″ E.

This is the greatest depth at which any Brachyurous Crustacean was taken by the Expedition, and also, I believe, the greatest depth hitherto recorded for any species of Crab.

Ethusa (*Ethusina*) *gracilipes*, n. sp. (Pl. XXVIII. fig. 3).

Carapace depressed, finely granulated, longer than broad, and narrowed anteriorly; with the cervical and cardiaco-branchial sutures distinctly defined; the front is armed with four spines, the two median of which are separated from one another by a somewhat wider and deeper interspace than that which intervenes between them and the two exterior spines; the spine at the exterior orbital angle is strongly developed; the orbits are incompletely defined. The epistoma is very narrow, transverse. The post-abdomen (in the male) is narrow and five-jointed, with the third to fifth segments coalescent. The eyes are small and taper but very slightly, if at all, from the base. The bases of the antennules are considerably dilated, as in *Ethusa sinuatifrons*, and usually bear a small distal spine or tubercle. The basal joint of the antennæ is short and slender and does not nearly attain the front; the flagellum is considerably elongated, reaching, when retracted, to the posterior margin of the carapace. The exterior maxillipedes are shaped nearly as in *Ethusa sinuatifrons*, but the ischium of the endognath is narrower and less robust. The chelipedes (in the male) are subequal and very slender, with the merus subcylindrical; carpus very short; palm but little

longer than the carpus, slightly compressed, and shorter than the fingers, which are slender, scarcely denticulated on the inner margins and are slightly decussate at the acute apices. The legs of the second and third pairs (in the typical form) are greatly elongated and very slender, with the joints smooth, the dactyli slightly curved, and exceeding the penultimate joints in length. Those of the fourth and fifth pairs are (in the typical variety) nearly filiform; the dactyli very short. The body and limbs are covered with an extremely short brownish or whitish pubescence.

Of this species two very distinct varieties were collected; the first represented by two adult males and two females, at Station 207, near the Philippines, in 700 fathoms, lat. 12° 21′ 0″ N., long. 122° 15′ 0″ E., the second by three adult females, dredged in 800 fathoms, in the Arafura Sea, Station 191, lat. 5° 41′ 0″ S., long. 134° 4′ 30″ E., and by an adult and larger female obtained in the Banda Sea, in 1425 fathoms, lat. 4° 21′ 0″ S., long. 129° 7′ 0″ E. (Station 195).

The first-mentioned variety was selected for description because there are males of it; the second variety is distinguished by the more dilated bases of the antennules, the slightly tapering, not cylindrical, eye-peduncles, and the more robust chelipedes and ambulatory legs. I propose to designate it var. *robusta*.

Adult ♂.	Lines.	Millims.
Length and breadth of carapace,	4½	9·5
Length of a chelipede, nearly	8	16·5
Length of third leg,	19	40
Length of fourth leg, nearly	6	12

The adult female specimen of the variety *robusta*, from 1425 fathoms (Station 195), which only differs from the specimens taken in 800 fathoms (Station 191) in the slightly more convex carapace, with more deeply accentuated sutures and the somewhat shorter exterior orbital spines, measures as follows:—

Adult ♀.	Lines.	Millims.
Length and breadth of carapace, nearly	7½	15·5
Length of a chelipede,	11	23
Length of third ambulatory leg, nearly	25½	53·5
Length of fourth ambulatory leg, about	11	23

Cymopolia, Roux.

Cymopolia, Roux, Crust. de la Mediterranée, pl. xxi., 1828.
„ Milne Edwards, Hist. Nat. Crust, vol. ii. p. 158, 1837.

Of this genus I have only examined three species, *Cymopolia caronii*, Roux, *Cymopolia jukesii*, White, and *Cymopolia whitei*, Miers, the numerous species recently described by A. Milne Edwards being unrepresented in the collections of H.M.S.

Challenger and of the Museum, as is also *Cymopolia gracilis*, Smith, it is therefore impossible for me to draw up a satisfactory description of the genus, the typical species of which are, however, sufficiently distinguished from *Dorippe* and *Ethusa* by their much more broadly tranverse carapace, with dentated (not spinose) front, and dentated antero-lateral margins, and by the nearly quadrate, not triangulate, buccal cavity, in which characters they more nearly resemble certain Catometopa than the Oxystomata. The afferent channel to the branchiæ opens immediately at the bases of the chelipedes, and is not separated from them, as in the species of *Dorippe*.

This genus is not very nearly allied either to *Dorippe* or *Ethusa*, and should not perhaps be referred to the same family, but it is retained in the vicinity of *Ethusa* by A. Milne Edwards and other authors, and here, accordingly, I retain it for the present.

The following species have been described:—

Cymopolia caronii, Roux. Mediterranean; Cape Verde Islands.
Cymopolia jukesii, White. North and North-East Australia; Sir C. Hardy Island; Celebes Sea (to 10 fathoms).
Cymopolia obesa, A. Milne Edwards.
Cymopolia dilatata, A. Milne Edwards.
Cymopolia dentata, A. Milne Edwards.
Cymopolia cristatipes, A. Milne Edwards.
Cymopolia cursor, A. Milne Edwards.
Cymopolia gracilipes, A. Milne Edwards.
Cymopolia sica, A. Milne Edwards.
Cymopolia acutifrons, A. Milne Edwards.
} Gulf of Mexico and Florida Straits (to 298 fathoms).
Cymopolia gracilis, Smith. New England (to 142 fathoms).
Cymopolia whitei, Miers. Seychelles (4 to 12 fathoms).

Cymopolia caronii, Roux.

Cymopolia caronii, Roux, Crust. de la Mediterranée, pl. xxi. figs. 1–7.
„ „ Milne Edwards, Hist. Nat. Crust, vol. ii. p. 159, 1837.
„ „ Lucas, Animaux articulés in Explor. Sci. de l'Algérie, Crust., p. 25, pl. iii. fig. 1, 1849.
„ „ Heller, Crust. des südlichen Europa, p. 140, pl. iv. fig. 8, 1863.

St. Vincent, Cape Verde Islands, July 1873. An adult female, bearing ova.

♀.	Lines.	Millims.
Length of carapace,	4½	9·5
Breadth of carapace, rather over	5	11

The specimen agrees closely with the figure of Roux, and with specimens referred to this species from the Canary Islands, in the collection of the Museum, but the merus-joints are perhaps slightly more dilated than is usual.

Cymopolia jukesii, White.

Cymopolia jukesii, White, App. to Jukes' Voy. H.M.S. "Fly," p. 338, pl. ii. fig. 1.
" " Miers, Crust. in Zool. of H.M.SS. "Erebus" and "Terror," No. xx. p. 3, pl. iii. fig. 4, 1874.

Celebes Sea, lat. 6° 54′ 0″ N., long. 122° 18′ 0″ E., in 10 fathoms (Station 212). An adult female, bearing ova.

Adult ♀.	Lines.	Millims.
Length of carapace,	$4\frac{1}{2}$	9·5
Breadth of carapace,	$5\frac{1}{2}$	11·5

The specimen is imperfect, having lost two of the legs, but one of these, the first of the ambulatory legs on the right hand side, is replaced by a new and imperfectly developed limb, measuring only 5 lines (10·5 mm.).

APPENDIX.

This long list of Errata must be attributed to the cause adverted to in the Introduction, which rendered it impossible for me to correct the sheets as they were passing through the press.

Page 282, line 21, *insert* the following definition of the group Oxystomata or Leucosiidea, which was unfortunately wanting in the MSS. when sent to the editor for press, I being uncertain whether the group should be sustained :—

OXYSTOMATA or LEUCOSIIDEA.

Carapace convex or depressed, transverse, with the antero-lateral margins arcuated or orbiculate, or even subglobose, or more or less oblong, with subparallel or slightly convergent margins (Dorippidæ). Epistome very much reduced or rudimentary. Buccal cavity more or less triangulate, nearly always produced and narrowed in front, with the margins anteriorly convergent. The afferent channels to the branchiæ enter either behind the pterygostomian regions and in front of the chelipedes, or, more rarely, at the antero-lateral angles of the palate (Leucosiidæ). Branchiæ six to nine (Claus). Antennules longitudinally or obliquely plicated. The carpal joint of the exterior maxillipedes is articulated either at the antero-internal angle or at the antero-external angle or at the distal extremity of the merus, and is frequently concealed beneath it. The verges of the male are exserted either from the sternal surface or more usually from the bases of the fifth pair of legs, which are either gressorial, natatorial, or feeble and raised upon the dorsal surface of the carapace.

The Oxystomata constitute a large but somewhat heterogeneous group, characterised generally by the triangulate or narrowed buccal cavity and the position of the afferent branchial channels, and related on the one hand to the Oxyrhyncha through the Leucosiidæ, and with the Anomura through the Dorippidæ. This group includes among the highly-specialised Leucosiidæ some of the most beautiful of the littoral species, and others (Calappidæ, Leucosiidæ) no less remarkable for peculiarity of form and structure. *Matuta*, in which genus all the legs are natatorial, is one of the best adapted for swimming of all the genera of Brachyura, and among the remarkable genera of the group Dorippidæ are found the forms which inhabit the deepest ocean depths, and those which most nearly approach the Anomura in the structure of the buccal organs and of the ambulatory legs.

Page 19, line 2 from bottom, for "*Menæthium*" read "*Menæthius.*"

Page 40, line 8 from bottom, for "*Halmius*" read "*Halimus.*"

Page 40, line 3 from bottom, for "*Peltina*" read "*Peltinia.*"

Page 53, line 7 from bottom, for "*Aretopisis*" read "*Arctopsis.*"

Page 56, lines 27–29. This short paragraph, beginning with the words, "The name *Hyastenus*," should be placed in a footnote, and the following paragraph, which contains the enumeration of species of Section 2 of the genus *Hyastenus*, should run on after the words, "Targioni-Tozzetti" in that section.

Page 83, line 11, for "*tenuidus*" read "*tumidus.*"

Page 87, line 14, for "*rubei*" read "*ruber.*"

Page 92, line 10, for "*Parthenopoides*, Miers" read "*Parthenolambrus*, A. Milne Edwards."

Page 99, line 10, *for* "crowded" *read* "eroded."

Page 108 (footnote). In this footnote, which exhibits in a tabulated form the parallelism existing between the genera comprised in the subsections *a* and *b* of the typical Cancridæ, the genera with acute finger-tips are placed in the left hand column and those with excavated

finger-tips in the right hand column. The genus *Lophozozymus*, in which the fingers are not excavated, should be transferred from the right hand column and placed after *Lophactæa*, A. Milne Edwards, and in like manner the genera *Panopeus*, Milne Edwards, and *Micropanope*, Stimpson, in which the finger-tips are acute, should be placed in the left hand column, after *Xanthodes*, Dana.

Page 113, line 8 from bottom, *for* "A. Milne Edwards" *read* "Milne Edwards."
Page 118, lines 18 and 24, for "*Medæus granulatus*" read "*Medæus haswelli.*"
Page 118, line 3 from bottom, for "*Banarcia*" read "*Banareia.*"
Page 135, line 14, *for* "ranged" *read* "ranges."
Page 136, line 10, *for* "plain" *read* "plane."
Page 139, line 20, for "*angulatus*" read "*ungulatus.*"
Page 146, line 23, *for* "Kepler" *read* "Kessler."
Page 147, line 16, for "*melanecanthus*" read "*melanacanthus.*"
Page 149, line 13, for "*vanquelinii*" read "*vauquelinii.*"
Page 172, line 21, *for* "T. J. Smith" *read* "S. I. Smith." (See also p. 219, line 7, p. 220, line 14, p. 222, line 29, p. 267, line 21, where *for* "S. J. Smith" *read* "S. I. Smith.")
Page 180, line 3 from bottom, for "*Amphitrite*" read "*Achelous.*"
Page 184, line 10 from bottom, for "*Gonisoma*" read "*Goniosoma.*"
Page 189, line 5 from bottom, for "*Goniosoma bispinosum*" read "*Cronius bispinosus.*"
Page 190, line 13 from bottom, *for* "Hoffman" *read* "Hoffmann."
Page 208, line 12 from bottom, for "*Plagusetis*" read "*Plagusetes.*"
Page 210, line 11, after "*Hypopeltarium*" erase the words "n. gen."
Page 220, line 6, for "*cressum*" read "*crassum.*"
Page 226, last line, *for* "Limoda" *read* "Simoda."
Page 255, line 6, *for* "fossetts" *read* "fossettes," and at line 23, for "*trigosus*" read "*strigosus.*"
Page 260, line 11 from bottom, *insert* a semicolon after the word "distinct."
Page 269, last line, *insert* a comma after the word "types."
Page 274, lines 17, 18, 19; page 275, line 17; page 278, lines 2, 23, 25, 27, 28; and at page 279, line 7, for "*Myctiris*" read "*Mycteris.*"
Page 275, line 13, and at page 278, line 1, *for* "Myctirinæ" *read* "Mycterinæ."
Page 282, line 20, *for* "1825" *read* "1853."
Page 295, line 4, for "*leneifera*" read "*lineifera.*"
Page 301, line 8 from bottom, *for* "later" *read* "lateral."
Page 302, line 7 from bottom, *for* "young male" *read* "sterile female."
Page 303, line 10 from bottom, for "*Leucisca*" read "*Leucisca.*
Page 304, line 29, *for* "Heller" *read* "Haller."
Page 305, lines 6, 7 from bottom, for "*spinosa*" read "*undecimspinosa.*"
Page 308, line 10 from bottom, *insert* a comma, and the word "are" *after* "remain."
Page 310, line 3 from bottom, *for* "each intestinal region" *read* "the intestinal region."
Page 323, line 12, *before* the word "contains" *insert* "it."
Page 329, line 14 from bottom, for "*sinuatifrons*" read "*challengeri.*"
Page 332, line 22, *for* "Pl. XXVIII. fig. 3" *read* "Pl. XXIX. fig. 1.
Page 333, line 17, after the words "var. *robusta*" insert a reference to the figure "(Pl. XXIX. fig. 2)."

In the Explanation to the Plates :—

Plate I. fig. 3*a* is magnified 5 diameters.
Plate IV. fig. 1*c* is magnified 3 diameters.
Plate IV. fig. 2, for "*mosleyi*" read "*moseleyi.*"
Plate IV. fig. 2*c* is magnified 3 diameters.
Plate VIII. fig. 1*b* is magnified 3 diameters.
Plate X. fig. 3*b* is magnified 4 diameters.
Plate XI. fig. 2*c* is magnified 6 diameters.
Plate XVI. fig. 1*d* is magnified 5 diameters.

INDEX.

Note,—Synonyms are printed in *italics;* the more important pages are indicated by darker type.

	Plate	Figure	Page
ACANTHOCARPUS, *Stimpson*,	...	...	288, 289, 293
ACANTHOCYCLUS, *Milne Edwards and Lucas*,	...	...	v, xiii, 208
gayi, *Milne Edwards and Lucas*,	...	...	xxxii, xxxvii, xli, xlvii, 209
villosus, Strahl,	...	...	209
ACANTHONYCHIDÆ,	...	...	x
ACANTHONYCHINÆ,	...	...	x, 34
ACANTHONYX, *Latreille*,	...	...	x, 39, 40, 42
brevifrons, A. Milne Edwards,	...	...	42, 43
concameratus, Kinahan,	...	...	42
consobrinus, *A. Milne Edwards*,	...	...	43
debilis, Dana,	...	...	42
dentatus, Milne Edwards,	...	...	39
elongatus, *White*,	...	...	43
emarginatus, Milne Edwards and Lucas,	...	...	42
limbatus, *A. Milne Edwards*,	...	...	43
lunulatus (*Risso*),	...	...	xviii, xxxvi, xliii, 43
lunulatus, *Guérin-Méneville*,	...	...	42
mac-leayii, *Krauss*,	...	...	43
petiverii, *Milne Edwards*,	...	...	42
quadridentatus, *Krauss*,	...	...	43
scutellatus, *MacLeay*,	...	...	43
simplex, *Dana*,	...	...	43
viridis, Costa,	...	...	42
ACANTHOPHRYS, *A. Milne Edwards*,	...	...	
aculeatus, A. Milne Edwards,	...	...	52, 53
cristimanus,	...	...	52
filholi, A. Milne Edwards,	...	...	52
ACANTHOPLAX, *Milne Edwards*,	...	...	237, 242
ACANTHOPUS, de Haan,	...	...	271
ACANTHUS, Leckington,	...	...	145
ACHÆOPSIS, *Stimpson*,	...	...	x, 6, 18, 28
güntheri, *Miers*,	...	...	18
ACHÆOPSIS—*continued.*	Plate	Figure	Page
spinulosus, *Stimpson*,	1.	4	xxi, xxxv, xliii, 18
ACHÆUS, *Leach*,	...		x, 6, 8, 18
affinis, *Miers*,	...	...	8
breviceps, Haswell,	...	...	8
brevirostris (*Haswell*),	...	...	8
cranchii, *Leach*,	...	...	8
japonicus, *de Haan*,	...	...	xxx, xxxviii, xliii, 8, 9
lacertosus, *Stimpson*,	...	...	8
lævioculis, *Miers*,	...	...	8
lorina, *Adams and White*,	...	...	8, 10
spinosus, *Miers*,	...	...	8, 10
tenuicollis, *n. sp.*,	1.	3	xxi, xxii, xxxviii, xliii, 8, 9, 10,
tuberculatus, *Miers*,	...	...	8
ACHELOUS, *de Haan*,	...	...	xiii, 169, 171, 172, 174, 179, 180, 181, 187
depressifrons, Stimpson,	...	...	xix, xxxvii, xlvi, 181
granulatus, A. Milne Edwards,	...	...	xxviii, xxx, xxxvii, xxxix, xlvi, 180, 181
granulatus, var. *unispinosus*, Miers,	...	...	180
paucispinus, Lockington,	...	...	174
spinicarpus, Stimpson,	...	...	182
spinimanus, Latreille,	...	...	172, 180
unispinosus, Miers,	...	...	xxv, xxxvii, xlvi, 180
whitei, A. Milne Edwards,	...	...	xxvi, xxxix, xlvi, 179, 180
ACMÆOPLEURA, *Stimpson*,	...	...	266
ACTÆA, *de Haan*,	...	...	xii, 108, 118, 119, 123, 133, 135
acantha (*Milne Edwards*),	...	...	121
affinis, A. Milne Edwards,	...	...	135
bella, A. Milne Edwards,	...	...	134

ACTÆA—*continued.*	Plate	Figure	Page
calculosa, *Milne Edwards*,	...	...	122
carcharias, *White*,	...	...	122
consobrina, *A. Milne Edwards*,	...	...	119
dovii, *Stimpson*,	...	...	119
glabra (*Kossmann*),	...	...	119
granulata (*Audouin*),	...	...	xxv, xxxvi xlv, 120, 122
hirsutissima (*Rüppell*),	...	...	xxv, xxxvi xlv, 120
hystrix, *n. sp.*,	xi.	3	xxv, xxxvi xlv, 119, 121
margaritaria, *A. Milne Edwards*,	...	...	119
nodosa, Stimpson,	...	...	122
nodulosa, *White*,	...	...	xxxi, xxxvi xlv, 120
parvula (*de Haan*),	...	...	119
peronii (*Milne Edwards*),	...	...	xxii, xxxvi xxxix, xlv 119, 122
pilosa, *Stimpson*,	...	...	120
rufopunctata (*Milne Edwards*),	...	...	122
rufopunctata (*Milne Edwards*), var. nodosa,	...	...	xx, xxxvi xlv, 122
spinifera, *Kingsley*,	...	...	119
sulcata, *Stimpson*,	...	...	119
tomentosa, A. Milne Edwards,	...	...	135
ACTÆODES, *Dana*,	...	...	xii, 108, 119, 134, 135, 136
affinis, Dana,	...	...	135
bellus, Dana,	...	...	134
cavipes, Dana,	...	...	133
faba, *Dana*,	...	...	135
fragifer (*White*),	...	...	135
mexicanus, Lockington,	...	...	138
nodipes, *Heller*,	...	...	135
polyacanthus, *Heller*,	...	...	135
pubescens (*Milne Edwards*),	...	...	135
speciosa, Dana,	...	...	135
tomentosus (*Milne Edwards*),	...	...	xxviii, xxxvi xlv, 135
variolosus (*A. Milne Edwards*),	...	...	135
xantho, Lockington,	...	...	119
ACTÆOMORPHA, *Miers*,	...	...	294, 318
erosa, *Miers*,	...	...	318
ACTUMNUS, *Dana*,	...	...	119
AMATHIA, Roux,	...	...	x, 12, 25, 26
AMORPHOPUS, *Bell*,	...	...	275
AMPHITRITE, *de Haan*,	...	...	xiii, 169, 171 172, 174, 179 180, 181, 183 187
argentata, White,	...	...	177
depressifrons, Stimpson,	...	...	181

AMPHITRITE—*continued.*	Plate	Figure	Page
edwardsii, Lockington,	...	...	188
gibbesii (Stimpson),	...	...	181
gladiator, de Haan,	...	...	xxvi, xxxix xlix, 172 177, 180
gladiator, var. *argentatus*, White,	...	...	xxix, xxxvii xlvi, 177
hastatoides, de Haan,	...	...	xxvi, xxvii xxx, xxxi xxxvii, xxxix, xlvi 175, 178
hastatus, *Linne*,	...	...	xvii, xxxix xlvi, 175
longispinosa, Dana,	...	...	183
rugosus, A. Milne Edwards,	...	...	xxv, xxviii xxix, xxxvii xlvi, 176
spinimanus,	...	...	172, 180
spinipes, *n. sp.*,	...	...	xxviii, xxxvii, xlvi 178
tuberculosus, A. Milne Edwards,	...	...	xxvii, xxxvii, xlvi 176
vigilans, Dana,	...	...	183
ANAMATHIA, *S. I. Smith*,	...	...	x, 12, 25, 28, 31
agassizii, *Smith*,	...	...	26
crassa (*A. Milne Edwards*),	...	...	26
hystrix (*Stimpson*),	...	...	26, 27
modesta (*Stimpson*),	...	...	26
pulchra, *n. sp.*,	iv.	1	xxix, xl, xliii, 26
rissoana, *Roux*,	...	...	25, 26, 27
tanneri, *Smith*,	...	...	26
ANASIMUS, *A. Milne Edwards*,	...	...	12
ANISONOTUS, *A. Milne Edwards*,	...	...	12
ANISOPUS, de Haan,	...	...	170, 201
punctatus, de Haan,	...	...	202
APOCREMNUS, *A. Milne Edwards*,	...	...	x, 12, 17
septemspinosus, *A. Milne Edwards*,	...	...	xx, xxxv, xliii 17
ARCANIA, *Leach*,	...	...	xvi, 298, 299 300, 305
duodecimspinosa, *Miers*,	...	...	299
globata, *Stimpson*,	...	...	299
granulosa, *Miers*,	...	...	299
novem-spinosa, *Adams and White*, var. aspera, *Miers*,	...	..	299
orientalis, *Miers*,	..	...	299
pulcherrima, *Haswell*,	...	...	299
septemspinosa, *Bell*,	...	...	299
septemspinosa (*Fabricius*),	...	...	xxvii, xxx xxxi, xxxviii xlix, 300
undecimspinosa, *de Haan*,	...	...	299

	Plate	Figure	Page
ARCTOPSIS, Lamarck,	...	...	x, 53
lanata, Lamarck,	...	...	55
tribulus (Linné),	...	...	xvii, xviii, xxxviii, xliv, 55
ARENÆUS, Dana,	...	...	169, 171
bidens, S. I. Smith,	...	...	172
ASTHENOGNATHIDÆ, Stimpson,	...	...	275
ASTHENOGNATHUS, *Stimpson*,	...	...	275
ATELECYCLUS, *Leach*,	...	...	vii, 211
spinulosus, White,	...	...	211
ATERGATIS, *de Haan*,	...	...	xii, 108, 111, 112, 113, 123
asperimanus, *White*,	...	...	112
compressipes, MacLeay,	...	...	112
floridus (*Linné*),	...	...	xxvii, xxviii, xxxvi, xlv, 112
insularis, Adams and White,	...	...	112
lævigatus, *A. Milne Edwards*,	...	...	112
lateralis, *White*,	...	...	112
marginatus, *de Haan*,	...	...	112
montrouzieri, *A. Milne Edwards*,	...	...	112
nitidus, *A. Milne Edwards*,	...	...	112
roseus, *Rüppell*,	...	...	112
roseus, var. alba, *Kossmann*,	...	...	112
scrobiculatus, *Heller*,	...	...	112
ATERGATOPSIS, *A. Milne Edwards*,	...	...	xii, 108, 123
amoyensis, *de Haan*,	...	...	123
granulatus, *A. Milne Edwards*,	...	...	xxvi, xxxix, xlv, 128
AULACOLAMBRUS, *A. Milne Edwards*,	...	...	xi, 93, 97, 100
hoplonotus, *Adams and White*,	...	...	xxv, xxxvi, xliv, xlv, 98
hoplonotus, var. *granulosus*,	...	...	xxxvi, xlv, 98
hoplonotus, var. *longioculis*,	...	...	xxxix, xlv, 99
BANAREIA, *A. Milne Edwards*	...	...	118
BATHYNECTES, *Stimpson*,	...	...	170, 186, 192, 200, 224, 225
BATHYPLAX, *A. Milne Edwards*,	...	...	xiv, 223, 230
typhlus, *A. Milne Edwards*, var. oculiferus, *nov.*,	xx.	3	xx, xxxix, xl, xlviii, 230
BELLIA, *Milne Edwards*,	...	...	208
BELLIDILIA, Kinahan,	...	...	xvi, 303
serratocostis, Kinahan,	...	...	305, 308, 309
undecimspinosa, Kinahan,	...	...	309
BRACHYGRAPSUS, Kingsley,	...	...	223, 231
kingsleyi, Miers,	...	...	232
lævis, Kingsley,	...	...	232
BRACHYNOTUS, *de Haan*,	...	...	xiv, 264
edwardsii, *Hilgendorf*,	...	...	264
longitarsis (*Miers*),	...	...	264

BRACHYNOTUS—*continued.*	Plate	Figure	Page
penicillatus (*de Haan*),	...	...	xxx, xxxvii, xlviii, 264
sexdentatus, *Risso*,	...	...	264
BRACHYURES, Milne Edwards,	...	...	1
CÆLOCHIRUS, *Nauck*,	...	...	262
CÆNOPHTHALMUS, *A. Milne Edwards*,	...	...	170
CALAPPA, *Fabricius*,	...	...	xv, 283, 288, 289, 290, 293
angustata, *A. Milne Edwards*,	...	...	284
bocagei, B. Capello,	...	...	284
convexa, *Saussure*,	...	...	284
depressa, *n. sp.*,	xxiii.	2	xxii, xxxviii, xlix, 284, 286, 287, 288
flammea (*Herbst*),	xxiii.	1	xix, xxi, xxxvii, xlix, 284
gallina (*Herbst*),	...	...	284
galloides, Stimpson,	...	...	286
gallus (*Herbst*),	...	...	xviii, xix, xx, xxvii, xxxviii, xxxix, xlix, 284, 286, 288, 289
gallus, var. bicornis, *Miers*,	...	...	284, 286
granulata, de Haan, &c.,	...	...	284, 285
granulata (*Linné*),	...	...	xviii, xxxix, xlix, 285, 338
guérinii, *B. Capello*,	...	...	284
hepatica (*Latreille*),	...	...	xxiv, xxvii, xxxi, xxxviii, xlix, 285, 288
lophos (*Herbst*),	...	...	xxiii, xxxix, xlix, 286, 287, 288
marmorata, Desmarest,	...	...	284
moniziana, *B. Capello*,	...	...	284
pelii, *Herklots*,	...	...	284
rubroguttata, *Herklots*,	...	...	284
sandwichien, Eydoux and Souleyet,	...	...	285
sanguineo-guttata, de Haan,	...	...	285
tuberculata, Fabricius,	...	...	285
xantusiana, Stimpson,	...	...	284
CALAPPIDÆ,	...	...	xv, xlix, 282
CALAPPINÆ,	...	...	xv, 283
CALAPPIENS, Milne Edwards,	...	...	xv, 282
CALLADACTYLUS, *Stimpson*,	...	...	298
CALLINECTES, *Stimpson*,	...	...	169, 172
CAMARA, *de Haan*,	...	...	283
CAMPTANDRIUM, *Stimpson*,	...	...	223
CAMPTONYX, Heller,	...	...	171
CAMPTOPLAX, *Miers*,	...	...	223
CANCER, *Lamarck*,	...	...	xii, 107, 108, 109, 131
admete, Herbst,	...	...	194
æneus, Latreille,	...	...	134
antennarius, *Stimpson*,	...	...	110

CANCER—*continued.*	Plate	Figure	Page
arachnoides, Rumph,	...	...	44
araneus, Latreille,	...	...	47
arenarius, Catesby,	...	...	240
berardii, de Haan,	...	...	215
biaculeatus, Montagu,	...	...	55
borealis, *Stimpson*,	...	...	110
bufo, Herbst,	...	...	47
callianassa, *Herbst*,	...	...	191
ceratophthalmus, Pallas,	...	...	238
chabrus, Latreille,	...	...	273
contrarius, Herbst,	...	...	94
coronatus, Herbst,	...	...	89
corrugatus, Pennant,	...	...	200
coryphe, Herbst,	...	...	89
craniolaris, Linné,	...	...	325
cruciatus, Herbst,	...	...	191
cuphæus, Linné,	...	...	313, 314
cursor, Linné,	...	...	240
cymodoce, Herbst,	...	...	166
depressus, Fabricius,	...	...	272, 273
dorsipes, *Linné*,	...	...	327
edwardsii, var. annulipes, *Miers*,	...	...	110
facchino, Herbst,	...	...	328
ferrugineus, Herbst,	...	...	146
flamnea, Herbst,	...	...	284
floridus, Linné,	...	...	112
fornicatus, Fabricius,	...	...	102
gallus, Herbst,	...	...	286
gonagra, Fabricius,	...	...	163
granulatus, Audouin,	...	...	120
granulatus, Linné,	...	...	284, 285
grapsus, Linné,	...	...	255
hastatus, Linné,	...	...	175
hepaticus, Linné,	...	...	285
hispidus, Herbst,	...	...	88
hydrophilus, Herbst,	...	...	124
inæqualis, Audouin,	...	...	137
incanus, Forskål,	...	...	148
incisus, Leach,	...	...	124
irroratus, *Say*,	...	...	110
limosus, Say,	...	...	141
litteratus, Fabricius,	...	...	265
lobatus, Milne Edwards,	...	...	113
longimanus, Linné,	...	...	95
longipes, *Bell*,	...	...	xxxii, xxxvi xlv, 110
longipes, Linné,	...	...	44
longirostris, Herbst,	...	...	55
lophos, Herbst,	...	...	286
lunaris, *Herbst*,	...	...	296
maculatus, Linné,	...	...	111
mediterraneus, *Herbst*,	...	...	312
messor, Forskål,	...	...	258
miniatus, Desbonne and Schramm,	...	...	117
minutus, Linné,	...	...	254
nigerrimus, Desbonne and Schramm,	...	...	133

CANCER—*continued.*	Plate	Figure	Page
ocyroë, Herbst,	...	...	112
pelagicus, Linné,	...	...	173
phalangium, Pennant,	...	...	6
planatus, Fabricius,	...	...	281
poressa, Olivi,	...	...	124
prymna, Herbst,	...	...	197
punctatus, Browne,	...	...	312
punctatus, Herbst,	...	...	313, 314
recurvidens (*Spence Bate*),	...	...	110
rufopunctatus, Herbst,	...	...	167
sagittarius, Fabricius,	...	...	4
sanguineo-guttatus, Herbst,	...	...	285
sanguinolentus, Herbst,	...	...	174
scorpio, Fabricius,	...	...	19
septemspinosus, Fabricius,	...	...	300
serratus, Forskål,	...	...	185
spectabilis, Herbst,	...	...	113, 114
squamosus, Herbst,	...	...	272
strigosus, Herbst,	...	...	256
tetragonon, Herbst,	...	...	243
tribulus, Linné,	...	...	55
tuberculatus, Herbst,	...	...	285
ursus, *Herbst*,	...	...	86
variegatus, Fabricius,	...	...	257
vestitus, de Haan,	...	...	229
victor, Fabricius,	...	...	295
vocans, Linné,	...	...	242
CANCÉRIENS, Milne Edwards,	...	...	xii, 106
ARQUÉS, Milne Edwards,	...	...	xii, 107
CRYPTOPHTHALMES,	...	...	xi
CANCÉRIENS CRYPTOPODES, Milne Edwards,	...	...	x, 2, 106
CANCÉRIENS QUADRILATÈRES, Milne Edwards,	...	...	xii, 107, 163
CANCRI BRACHYURI, Lamarck,	...	...	1
CANCRIDÆ,	...	...	xii, xlv, 106
CANCRINÆ,	...	...	xii, 107
CANCRINEA,	...	...	xii, 106
CANCROIDEA, Dana,	...	...	xii, xlv, 106
CANCROIDEA GRAPSIDICA, Dana,	...	...	212
TYPICA,	...	...	106
CAPHYRA, *Guérin*,	...	...	171
CAPHYRINÆ,	...	...	170
CARCINASPIS, *Stimpson*,	...	...	303
CARCININÆ,	...	...	199
CARCINOPLACINÆ,	...	...	xiv, 222, 223
CARCINOPLAX, *Milne Edwards*,	...	...	222, 223, 233
integra, *Miers*,	...	...	233
vestitus, Milne Edwards,	...	...	229
CARCINIENS, A. Milne Edwards,	...	...	170
CARCININÆ,	...	...	170
CARCINUS, *Leach*,	...	...	170
CARDISOMA, *Latreille*,	...	...	219
carnifex (Latreille),	...	...	220
CARDIOSOMA, *Latreille*,	...	...	xiv, 218, 219
armatum, *Herklots*,	...	...	xix, xli xlvii, 220
barbatus, Milne Edwards,	...	...	220

	Plate	Figure	Page
CARDIOSOMA—*continued.*			
barbiger (*Poeppig*),	...	...	220
carnifex (*Herbst*),	...	...	xxiv, xxix, xxxi, xli, xlvii, 219, 220, 221
crassum, *Smith*,	...	...	220
diurnum, Gill,	...	...	220
guanhumi, *Latreille*,	...	...	xix, xli, xlvii, 219, 220
hirtipes, Dana,	...	...	219
hirtipes, *de Man*,	...	...	221
latimanus, Lockington,	...	...	220
obesum, Dana,	...	...	219
quadratum, Saussure,	...	...	220
urvillei, *Milne Edwards*,	...	...	220
CARPILIUS, *Desmarest, Leach*,	...	...	xii, 107, 108, 110, 111
convexus (*Forskål*),	...	...	111
lividus, *Gibbes*,	...	...	111
maculatus (*Linné*),	...	...	xxxi, xxxvi, xlv, 111
prætermissus, *Gibbes*,	...	...	111
CARPILODES, *Dana*,	...	...	xii, 108, 119, 132, 133, 134, 136
bellus (*Dana*),	...	...	xxviii, xxxvi, xlv, 133, 134
cinctimanus (*Adams and White*),	...	...	125, 133
dia (*White*),	...	...	133
edwardsii, *Kossmann*,	...	...	133
granulosus, *Haswell*,	...	...	133
longimanus (*A. Milne Edwards*),	...	...	133
margaritatus, *A. Milne Edwards*,	...	...	133
monticulosus, *A. Milne Edwards*,	...	...	133
CARUPA, *Dana*,	...	...	169, 205
CARUPIENS, A. Milne Edwards,	...	...	169
CATOMETOPA,	...	...	xiv, xlvii, 216
CATOMETOPES, Milne Edwards,	...	...	xiv, 216
CATOPTRUS, *A. Milne Edwards*,	...	...	223
CERATOCARCINUS, *Adams and White*,	...	...	xii, 91, 104
dilatatus, *A. Milne Edwards*,	...	...	105
longimanus, *Adams and White*,	...	...	xxvii, xxxvi, xlv, 105
speciosa, *Dana*,	...	...	105
spinosus, *Miers*,	...	...	105
CERATOPLAX, *Stimpson*,	...	...	xiv, 228, 233, 234, 235, 236
arcuata, *Miers*,	...	...	xxvi, xxxix, xlviii, 234, 235
ciliata, *Stimpson*,	xix.	3	xxv, xxxvii, xlviii, 234
lævis, *Miers*,	...	...	234
CHÆNOSTOMA, Stimpson,	...	...	xiv, 237, 251
boscii,	...	...	xxiv, xxxvii, xlviii, 252
CHALÆPUS, Gerstæcker,	...	...	223, 224
trispinosus (*Herbst*),	...	...	224
CHARYBDEA, *Péron et Lesueur*,	...	...	189
CHARYBDIS, de Haan,	...	...	170, 189, 192
variegatus, de Haan,	...	...	190
CHASMAGNATHUS, *de Haan*,	...	...	268, 269
CHLORINOIDES, *Haswell*,	...	...	x, 19, 43, 51, 52
acanthonotus (*Adams and White*),	...	...	53
aculeatus (*Milne Edwards*)	...	...	53
aculeatus, var. armatus, *Miers*,	...	...	53
coppingeri (*Haswell*),	VII.	3	xxii, xxxviii, xliv, 52, 53
filholi (*A. Milne Edwards*),	...	...	52
halimoides (*White*),	...	...	53
longispinus (*de Haan*),	...	...	52, 53
longispinus, var. bituberculatus, *Miers*,	...	...	52, 53
spatulifer (*Haswell*),	...	...	52
tenuirostris, *Haswell*,	...	...	52
CHLORODIUS, Dana,	...	...	136, 139
areolatus, Adams and White,	...	...	139
edwardsii, Heller,	...	...	137
fischeri, Lockington,	...	...	137
floridanus, *Gibbes*,	...	...	137
limosus, Desbonne and Schramm,	...	...	137
monticulosus, Dana,	...	...	139
obscurus, Jacquinot and Lucas,	...	...	139
sanguineus, Milne Edwards,	...	...	137, 138
CHLOROLIBINIA gracilipes, Haswell,	...	...	46
CHORILIA, *Dana*,	...	...	x, 56
oryx, *A. Milne Edwards*,	...	...	xxvi, 58
CHORILIBINIA, *Lockington*,	...	...	x, 45
angusta, *Lockington*,	...	...	45, 46
gracilipes, *Miers*,	...	...	xxv, xxvi, xxxvi, xxxviii, xliv, 45, 46
CHORINUS, *Leach*,	...	...	45, 52
acanthonotus, *Adams and White*,	...	...	53
aculeatus, *Milne Edwards*,	...	...	53
armatus, Randall,	...	...	76
longispina (*de Haan*),	...	...	53
CLEISTOSTOMA, *de Haan*,	...	...	237
CORYCODUS, *A. Milne Edwards*,	...	...	326
CORYRHYNCHUS, Kingsley,	...	...	x, 10, 11
riisei, Kingsley,	...	...	11
CORYSTES,	...	...	vii
punctatus, de Haan,	...	...	202
viginti-spinosa, de Haan,	...	...	212

	Plate	Figure	Page
Corystiens, Milne Edwards,	...	...	xiii, 209
CORYSTOIDEA,	...	...	xiii, xlvii, 209
Corystoides, *Lucas*,	...	...	208
Cronius, *Stimpson*,	...	...	xiii, 170, 187 188
bispinosus, *n. sp.*,	xv.	2	xx, xxxvii xlvi, 188, 189
milleri (*A. Milne Edwards*),	...	...	188, 189
ruber (*Lamarck*),	...	...	188, 189
Crossotonotus, *A. Milne Edwards*,	...	...	208
Cryptocnemus, *Stimpson*,	...	...	297
Cryptocœloma, *Miers*,	...	...	149, 223
Cryptopodia, *Milne Edwards*,	...	...	xi, 101, 102 103, 107
fornicata (*Fabricius*),	...	...	xxyi, xxxix xlv, 102
granulata, Gibbes,	...	...	103
spatulifrons, *Miers*,	...	...	102
spatulifrons, var. lævimana, *Miers*,	...	...	120
Cryptosoma, *Brullé*,	...	...	xv, 283, 288 291, 292, 293
bairdii, *Stimpson*,	...	...	293
cristatum (*Leach*),	...	...	xviii, xxxviii xlix, 298
dentatum, *Brullé*,	...	...	293
granulosum (*de Haan*),	...	...	293
orientis, Adams and White,	...	...	291
Curtonotus, de Haan,	...	...	222, 223
vestitus, de Haan,	...	...	229
CYCLINEA,	...	...	xiii, xlvii, 208
Cyclocœloma, *Miers*,	...	...	84
Cyclodorippe, *A. Milne Edwards*,	...	...	326
Cyclöes, de Haan,	...	...	xv, 283, 292, 293
Cyclograpsus latreillei, Milne Edwards,	...	...	268
CYCLOMETOPA,	...	...	xii, xlv, 106
Cyclométopes, *Milne Edwards*,	...	...	xii, 106
Cymo, *de Haan*,	...	...	208
Cymonomus, *A. Milne Edwards*,	...	...	326, 329
Cymopolia, *Roux*,	...	...	xvi, 326, 333
acutifrons, *A. Milne Edwards*,	...	...	334
caronii, *Roux*,	...	...	xviii, xxxviii l, 333, 334
cristatipes, *A. Milne Edwards*,	...	...	334
cursor, *A. Milne Edwards*,	...	...	334
dentata, *A. Milne Edwards*,	...	...	334
dilatata, *A. Milne Edwards*,	...	...	334
gracilipes, *A. Milne Edwards*,	...	...	334
gracilis, *Smith*,	...	...	334
jukesii, *White*,	...	...	xxix, xxxviii l, 333, 334, 335

	Plate	Figure	Page
Cymopolia—*continued.*			
obesa, *A. Milne Edwards*,	...	...	334
sica, *A. Milne Edwards*,	...	...	334
whitei, *Miers*,	...	...	333, 334
Cymopolus, *A. Milne Edwards*,	...	...	326
Cyrtograpsus, *Dana*,	...	...	257, 264
Cyrtomaia, *n. gen.*,	...	...	x, 12, 14
murrayi, *n. sp.*,	III.	1	xxvi, xl, xliii 15
suhmii, *n. sp.*,	III.	2	xxix, xl, xliii 16
Dehaanius, *MacLeay*,	...	...	x, 39
acanthopus, MacLeay,	...	...	39
dentatus (*Milne Edwards*),	...	...	xxi, xxxv xliii, 39
Dione,	...	...	xi, xxi, xxxv xliii
affinis, de Haan,	...	...	67
Discoplax, A. Milne Edwards,	...	...	260
longipes, *A. Milne Edwards*,	...	...	260
Dissodactylus, *Smith*,	...	...	274
Doclea, *Milne Edwards and Lucas*,	...	...	72, 73
orientalis, Miers,	...	...	73
Dorippa facchino, de Haan,	...	...	328
japonica, de Haan,	...	...	328
sima, Milne Edwards,	...	...	328
Dorippe, *Fabricius*,	...	...	xvi, 326, 327 329, 334
armata, *White*,	...	...	327
australiensis, *Miers*,	...	...	327
callida, *Fabricius*,	...	...	328
facchino (*Herbst*),	...	...	xxvii, xxxviii l, 328
granulata, *de Haan*,	...	...	327
japonica, *v. Siebold*,	...	...	xxx, xxxix l, 327, 328
lanata,	...	...	328
quadridentata, *Milne Edwards*,	...	...	327
sexdentata, *Stimpson*,	...	...	327, 329
sima,	...	...	328
Dorippidæ,	...	...	xvi, l, 326
Dorippiens, Milne Edwards,	...	...	xvi, 326
Dorynchus thomsoni, Norman,	...	...	x, 28
Dotilla, *Stimpson*,	...	...	ix, 274, 275
Doto (*de Haan*),	...	...	ix, 274, 275
Dryope falcipoda, Desbonne and Schramm,	...	...	11
Ebaliinæ,	...	...	xvi
Ebalia, *Leach*,	...	...	xvi, 299, 303 304, 312
affinis, *Miers*,	...	...	305
algerica, Lucas,	...	...	304
aspera, Costa,	...	...	304
bituberculata, Miers,	...	...	305
costæ, Heller,	...	...	305
cranchii (*Leach*),	...	...	304
crassipes (*Bell*),	...	...	xxii, xxiii xxxviii, xxxix, xlix 305, 307

EBALIA—*continued.*	Plate	Figure	Page
dentifrons, *n. sp.*,	XXV.	4	xxii, xxxviii, xlix, 305, 310
deshayesii, Lucas,	...	...	304
discrepans, Costa,	...	...	304
edwardsii, *Costa*,	...	...	304
elegans, Capello,	...	...	305
erosa, (*A. Milne Edwards*),	...	...	305
fragifera, *Miers*,	...	...	305, 307
granulata (*Rüppell*),	...	...	305, 307
granulosa (*Haswell*),	...	...	305
granulosa, *Milne Edwards*,	...	...	304, 310
insignis, Lucas,	...	...	304
intermedia, *n. sp.*,	XXV.	2	xxi, xxxix, xlix, 305, 308
lævis (*Bell*),	...	...	xxiii, xxxviii, xl, xlix, 305, 306
lambriformis (*Bell*),	...	...	xxvi, xxxix, xlix, 305, 306
maderensis, *Stimpson*,	...	...	305
mammillosa, *Desbonne and Schramm*,	...	...	319
miliaris, *A. Milne Edwards*,	...	...	305
minor, *Miers*,	...	...	305
nux, *Norman*,	...	...	305
orientalis, *Kossmann*,	...	...	305
pulchella, *A. Milne Edwards*,	...	...	305
quadrata (*A. Milne Edwards*),	...	...	305
quadridentata, Gray,	...	...	305, 309
quadridentata, *Gray*, var. spinifera, *nov.*,	XXV.	3	xxiii, xxxviii, xlix, 305, 309
ramsayi (*Haswell*),	...	...	305
rhomboidalis, *Miers*,	...	...	305
setubalensis, *Capello*,	...	...	305
spinosa, *A. Milne Edwards*,	...	...	305
stimpsonii, *A. Milne Edwards*,	...	...	305
tuberculata, *Miers*,	...	...	305, 307
tuberculosa (*A. Milne Edwards*),	XX.	1	ii, xxi, xxii xxiii, xxxix xl, xlix, 305 306, 307
tuberosa (*Pennant*),	...	...	304, 305
tumefacta (*Mont.*),	...	...	304
undecimspinosa (*Kinahan*),	...	...	305
undecimspinosa (*Kinahan*), var. orbicularis,	...	...	xxii, xxiii, xxxviii, xlix 309
EBALIINÆ, *Stimpson*,	...	...	xvi
ECHINOPLAX, *n. gen.*,	...	...	x, 12, 30, 31
moseleyi, *n. sp.*,	IV.	2	xxix, xl, xliii, 32
EGERIA, *Leach*,	...	...	x, 44, 46

EGERIA—*continued.*	Plate	Figure	Page
arachnoides (*Rumph*),	...	...	xxvi, xxix xxxvi xxxviii, xliv 44
herbstii, Milne Edwards,	...	...	44
indica, Leach,	...	...	44
ELAMENA, *Milne Edwards*,	...	...	275
ELAMENOPSIS, *A. Milne Edwards*,	...	...	275
ENOPLOLAMBRUS, *A. Milne Edwards*,	...	...	92
ENTOMONYX, *Miers*,	...	...	71
EPIALTUS, *Milne Edwards*,	...	...	38, 43
EPIGRAPSUS, *Heller*,	...	...	xiv, 265, 266
politus, *Heller*,	...	...	xxv, xxxviii xlviii, 266
ERGASTICUS, *A. Milne Edwards*,	...	...	x, 12, 29, 31 32
clouei, *A. Milne Edwards*,	...	...	30, 31
naresii, *n. sp.*,	V.	3	xxix, xl, xliii 29, 30
ERIOCHEIR penicillatus, de Haan,	...	...	264
ERIPHIA, *Latreille*,	...	...	xii, 107, 109 162
armata, *Dana*,	...	...	218
fordii, MacLeay,	...	...	162
gonagra (*Fabricius*),	...	...	xix, xxxvii xlvi, 162, 163
granulosa, *A. Milne Edwards*,	...	...	162
lævimana, *Milne Edwards*,	...	...	162
rugosa, Milne Edwards,	...	...	162
scabricula, *Dana*,	...	...	162
smithii, MacLeay	...	...	162
spinifrons (*Herbst*),	...	...	162
squamata, *Stimpson*,	...	...	162
trapeziformis, *Hess*,	...	...	162
ERIPHIDÆ, *Dana*,	...	...	xii, 106
ETHUSA, *Roux*,	...	...	xvi, 326, 328 331, 334
abyssicola (*Smith*),	...	...	329
americana, *A. Milne Edwards*,	...	...	329
challengeri, *n. sp.*,	XXVIII.	2	xxxi, xxxv xli, l, 331
gracilipes, *n. sp.*,	XXIX.	1	xxviii, xli, l 329, 332
gracilipes, var. robusta, *nov.*,	XXIX.	2	xxvi, xxvii xxxv, xli, l 329, 333
granulata, *Norman*,	...	...	231, 329
mascarone, *Roux*,	...	...	329
microphthalma, *Smith*,	...	...	xviii, xli, l, 329
orientalis, *n. sp.*,	XXVIII.	1	xxiv, xl, l 329, 330
sexdentata,	...	...	329
ETHUSINA, *Smith*,	...	...	xvi, 326, 328 330, 331
abyssicola, *Smith*,	...	...	329, 331
challengeri, *n. sp.*,	...	...	xxxi, xxxv xli, l, 331

ETHUSINA—*continued.*	Plate	Figure	Page
gracilipes,	...	...	xxvii, l, 329, 332
gracilipes, var. *robusta*,	...	...	xxvi, xxvii, xxxv, xli, l, 329, 333
ETISODES, *Dana*,	...	...	132
ETISUS, *Milne Edwards*,	...	...	xii, 108, 131, 132
anaglyptus, *Milne Edwards*,	...	...	132
convexus, Stimpson,	...	...	132
dentatus, *Milne Edwards*,	...	...	132
deflexus, *Dana*,	...	...	132
lævimanus, *Randall*,	...	...	xxiv, xxxi, xxxvi, xlv, 131, 132
macrodactylus, Jacquinot and Lucas,	...	...	132
maculatus, *Heller*,	...	...	132
occidentalis, White,	...	...	131, 137
punctatus, *Jacquinot and Lucas*,	...	...	132
rhynchophorus (*A. Milne Edwards*),	...	...	132
utilis, *Jacquinot and Lucas*,	...	...	131
EUCHIROGRAPSUS, *Milne Edwards*,	...	...	252
EUCRATE, *de Haan*,	...	...	223, 227
sexdentata, Haswell,	...	...	229
EUCRATOPLAX, *A Milne Edwards*,	...	...	222
EUCRATOPSINÆ, Stimpson,	...	...	222
EUCRATOPSIS, *S. I. Smith*,	...	...	222
EUCTENOTA, Gerstæcker,	...	...	169, 171, 172
mexicana, *Gerstæcker*,	...	...	172
EUMEDONINÆ,	...	...	xii, 104
EUPILUMNUS, *Kossmann*,	...	...	145
EUPHYLAX, *Stimpson*,	...	...	206
EUPLAX, *Milne Edwards*,	...	...	xiv, 237, 251
boscii, *Milne Edwards*,	...	...	xxiv, xxxvii, xlviii, 251
boscii (*Audouin*),	...	...	252
leptophthalmus, *Milne Edwards*,	...	...	251
EUPLEURODON, *Stimpson*,	...	...	38
EUPROGNATHA, *Stimpson*,	...	...	12
rastellifera, *Stimpson*,	...	...	18
EURYCARCINUS, *A. Milne Edwards*,	...	...	142
grandidieri, *A. Milne Edwards*,	...	...	142
EURYOZIUS, *sub-gen. nov.*,	...	...	xii, 109, 142
EUROPANOPEUS, *sub-gen. nov.*	...	...	124, 130, 140
EURYPLACINÆ,	...	...	222
EURYPLAX, *Stimpson*,	...	...	222
EURYPODIDÆ, *Stimpson*,	...	...	x
EURYPODIUS, *Guérin-Méneville*,	...	...	x, 12, 21
latreillei, *Guérin-Méneville*,	IV.	3	xxxii, xxxiii, xxxv, xxxviii, xliii, 21, 22, 23, 24

EURYPODIUS—*continued.*	Plate	Figure	Page
longirostris, *n. sp.*,	v.	1	xxxii, xl, xliii, 22, 23
EURYTIUM, *Stimpson*,	...	...	xii, 109, 140
affine, (*Streets and Kingsley*),	...	...	140
limosum (*Say*),	...	...	xx, xxxvi, xlv, 140, 141
EUXANTHODES, Paulson,	...	...	118
FABIA, *Dana*,	...	...	274
FISHERIA,	...	...	xi
depressa, Lockington,	...	...	83
FREVILLEA, *A. Milne Edwards*,	...	...	228
GALENE, *de Haan*,	...	...	...107, 118, 222, 224
bispinosus (*Herbst*),	...	...	118
granulata, *Miers*,	...	...	118
natalensis, *Krauss*,	...	...	142
GALLUS, de Haan,	...	...	xv, 283
gallus, de Haan,	...	...	286
gallus (Herbst),	...	...	288
GECARCINACEA, Milne Edwards,	...	...	216
GECARCINIDÆ, Dana,	...	...	xiv, 216
GECARCINIENS, Milne Edwards,	...	...	xiv, 216
GELASIMUS, *Latreille*,	...	...	xiv, 207, 237, 238, 241, 242
annulipes, *Milne Edwards*,	...	...	xxiv, xxviii, xxxvii, xlviii, 244, 245
annulipes, var. *albimana*, Kossmann,	...	...	244
chlorophthalmus, *Milne Edwards*,	...	...	245
cimatodus, *Rockebrune*,	...	...	241
cultrimanus, *Adams and White*,	...	...	242
gaimardi, *Milne Edwards*,	...	...	245
macrodactylus, *Milne Edwards and Lucas*,	...	...	245
marionis, Milne Edwards,	...	...	244
nitidus, Dana,	...	...	242
perplexus, Milne Edwards,	...	...	244, 245
porcellanus, White,	...	...	244
pulchellus, Stimpson,	...	...	244, 245
rectilatus, Lockington,	...	...	244
rubripes, *Jacquinot and Lucas*,	...	...	xxviii, xxxvii, xlviii, 243
splendidus, Stimpson,	...	...	244
tetragonon (*Herbst*),	...	...	xxvii, xxxi, xxxvii, xlviii, 242, 243
thomsoni, *Kirk*,	...	...	241
vocans (*Linné*),	...	...	xxiv, xxvii, xxxvii, xlviii, 242, 243
GEOCARCINIDÆ,	...	...	xiv, xlvii, 216
GEOCARCINUS, *Leach*,	...	...	xiv, 217, 219
barbatus, *Poeppig*,	...	...	218
depressus, *Saussure*,	...	...	218
lagostoma, *Milne Edwards*	XVIII.	2	ii, xix, xli, xlvii, 217, 218
lateralis,	...	...	ii, 218

	Plate	Figure	Page
GEOCARCINUS—*continued.*			
planatus, *Stimpson*,	...	...	218
regius, *Poeppig*,	...	...	218
GEOGRAPSUS, *Stimpson*,	...	...	xiv, 260, 261
brevipes, Milne Edwards,	...	...	260
crinipes, *Dana*,	...	...	260
depressus, Heller,	...	...	260
eydouxi, *Milne Edwards*,	...	...	261
grayi, *Milne Edwards*,	...	...	xxiv, xxxvii, xlviii, 260, 261
hillii (*Kingsley*),	...	...	261
lividus, *Milne Edwards*,	...	...	260
(?) longipes (*A. Milne Edwards*),	...	...	261
longitarsis (*Dana*),	...	...	260
occidentalis, Stimpson,	...	...	260
rubidus, Stimpson,	...	...	260
GEOTHELPHUSA, *Stimpson*,	...	...	xiii, 214
dehaanii (White),	...	...	xxx, xxxi, xli, xlvii, 215
GERYON, *Krŏyer*,	...	...	xiv, 223, 224
incertus, *n. sp.*,	xvi.	3	xix, xx, xl, xlviii, 224, 225
longipes, *A. Milne Edwards*,	...	...	224
quinquedens, *Smith*,	...	...	224
tridens, *Krŏyer*,	...	...	224
GLYPTOPLAX, *Smith*,	...	...	222
GNATHOGRAPSUS, *A. Milne Edwards*,	...	...	262
pilipes, *A. Milne Edwards*,	...	...	262, 263
GOMEZA, *Gray*,	...	...	xiii, 210, 211
bicornis, *Gray*,	...	...	xxix, xxxvii, xlvii, 212
serrata, *Dana*,	...	...	212
viginti-spinosa, A. Milne Edwards,	...	...	212
GONATORHYNCHUS, *Haswell*,	...	...	x, 12, 24
tumidus, *Haswell*,	...	...	xxii, xxxv, xliii, 25
GONIOGRAPSUS, *Dana*,	...	...	259
cruentatus, Dana,	...	...	267
innotatus, Dana,	...	...	259
marmoratus, *Fabricius*,	...	...	259
GONIOPSIS, *de Haan*,	...	...	xiv, 266
cruentatus (*Latreille*),	...	...	xx, xxxviii, xlviii, 267
flavipes, MacLeay,	...	...	256
pulcher (*Lockington*),	...	...	267
GONIOSOMA, *A. Milne Edwards*,	...	...	xiii, 170, 184, 187, 188, 189, 192
acutifrons, *de Man*,	...	...	190
acutum, *A. Milne Edwards*,	...	...	190
callianassa, *A. Milne Edwards*,	...	...	191
cruciferum (*Fabricius*),	...	...	xxvii, xxxvii, xlvii, 191
danæ, A. Milne Edwards,	...	...	192
dubium, *Hoffmann*,	...	...	190

	Plate	Figure	Page
GONIOSOMA—*continued.*			
erythrodactylum, *Lamarck*,	...	...	188
hellerii, *A. Milne Edwards*,	...	...	190
longifrons, *A. Milne Edwards*,	...	...	190
orientale, *Dana*,	...	...	190
ornatum, *A. Milne Edwards*,	...	...	xxvi, xxxix, xlvii, 191
spiniferum, *Miers*,	...	...	190
variegatum (*Fabricius*),	...	...	xlvi, 190, 191
variegatum, var. bimaculatum, *nov.*,	xv.	3	xxx, xxxix, xlvi, 191
GONOPLACES CANCÉROIDES,	...	...	237
GONOPLACES VIGILS,	...	...	237
GONOPLACIENS,	...	...	236
GONOPLACINÆ,	...	...	237, 245
GONOPLAX, *Leach*,	...	...	xiv, 237, 245, 247
rhomboides (*Linné*),	...	...	246
sinuatifrons, *n. sp.*,	xx.	2	xxvii, xxxvii, xxxix, xlviii, 245, 246
GRAPSILLUS, MacLeay,	...	...	163
maculatus, MacLeay,	...	...	165
subinteger, *MacLeay*	...	...	165
GRAPSIDÆ,	...	...	xiv, xlviii, 252
GRAPSINÆ,	...	...	xiv, 252, 253
GRAPSINI,	...	...	253
GRAPSOIDEA, Dana,	...	...	xiv, 216
GRAPSOIDIENS, Milne Edwards,	...	...	xiv, 252
GRAPSUS, *Lamarck*,	...	...	xiv, 254, 257, 258, 260, 267
æthiopicus, Hilgendorf,	...	...	258
crinipes, *Dana*,	...	...	261
cruentatus, Latreille,	...	...	267
gaimardii, Audouin,	...	...	258
gracilipes, *Milne Edwards*,	...	...	255
grayi, Milne Edwards,	...	...	261
inornatus, *Hess*,	...	...	257
maculatus (*Catesby*),	...	...	xviii, xix, xx, xxi, xxxvii, xlviii, 255
maculatus, Milne Edwards,	...	...	255, 256
messor, Milne Edwards,	...	...	258
pictus, Latreille,	...	...	255
pictus, var. *ocellatus*, Studer,	...	...	255, 256
pusillus, de Haan,	...	...	254
simplex, *Herklots*,	...	...	255
strigosus (*Herbst*),	...	...	xxvii, xxxvii, xlviii, 255, 256
variegatus, Latreille,	...	...	257
webbi, *Milne Edwards*,	...	...	256
GUIA, Milne Edwards,	...	...	xvi, 303, 311
HALICARCINUS, *White*,	...	...	xv, 275, 279, 280
leachii, *Nicolet*,	...	...	281
lucasii, *Nicolet*,	...	...	281

HALICARCINUS—*continued.*	Plate	Figure	Page
ovatus, *Stimpson*,	...	...	xxi, xxii, xxxviii, xxxix, xlix, 281, 282
planatus (*Fabricius*),	...	...	xvii, xxxiii, xxxviii, xxxix, xl, xlix, 281, 282
HALIMEDE (*de Haan*),	...	...	117
HALIMUS,	...	...	40
HEDROPHTHALMUS, *Nauck*,	...	...	170, 206
HELICE, *de Haan*,	...	...	xiv, 268
crassa, *Dana*,	...	...	xxiii, xxxviii, xlviii, 269
latreillei, *Milne Edwards*, var.,	xxi.	2	xxiv, xxviii, xxxviii, xlviii, 268
longipes (*Krauss*),	...	...	268
HELLENUS, *A. Milne Edwards*,	...	...	xiii, 169, 171, 182
spinicarpus (Stimpson),	...	...	xx, xl, xlvi, 172, 182
HELŒCIUS, *Dana*,	...	...	237, 242
HEMIPLAX, *Heller*,	...	...	xiv, 237, 250
hirtipes, *Heller*,	...	...	xxiii, xxxvii, xlviii, 251
HEPATINÆ,	...	...	294
HEPATUS, *Latreille*,	...	...	294
HERBSTIA, *Milne Edwards*,	...	...	x, 48, 49, 50
camptacantha, *Stimpson*,	...	...	49
condyliata (*Herbst*),	...	...	49, 51
crassipes, *A. Milne Edwards*,	...	...	49
depressa (*Stimpson*),	VII.	2	xx, xxxviii, xl, xliv, 49, 51
edwardsii (*Bell*),	...	...	49
eryophora, *Rochebrune*,	...	...	49
ovata, *Stimpson*,	...	...	xviii, xxxvi, xliv, 49, 50
parviformis (*Randall*),	...	...	49
pubescens, *Stimpson*,	...	...	49
pyriformis (*Bell*),	...	...	49, 50
rubra, *A. Milne Edwards*,	VII.	1	xviii, xxxvi, xliv, 49, 50
tumida, *Stimpson*,	...	...	49
violacea (*A. Milne Edwards*),	...	...	xviii, xxxvi, xliv, 49, 50
HERBSTIELLA, *Stimpson*,	...	...	x, 49, 50
depressa, Stimpson,	...	...	xx, xxxviii, xl, xliv, 51
HETERACTÆA, *Lockington*,	...	...	147
HETEROCRYPTA, *Stimpson*,	...	...	xi, 102
granulata (*Gibbes*),	...	...	xx, xxxvi, xlv, 103
macrobrachia, *Stimpson*,	...	...	103
maltzani, *Miers*,	...	...	xviii, xxxix, xl, xlv, 103
marionis, A. Milne Edwards,	...	...	103
HETEROGRAPSUS, Lucas,	...	...	264

HETEROGRAPSUS—continued.	Plate	Figure	Page
penicillatus, Stimpson,	...	...	xxx, xxxvii, xlviii, 264
sexdentatus, *Milne Edwards*,	...	...	264
HETEROPANOPE, *Stimpson*,	...	...	129
dentatus (*Adams and White*),	...	...	129
HETEROPLAX, *Stimpson*,	...	...	146, 223, 227
nitidus, *Miers*,	...	...	227
HETEROZIUS, *A. Milne Edwards*,	...	...	125
HEXAPODINÆ,	...	...	275
HEXAPUS, *de Haan*,	...	...	275
HOLOMETOPUS, *Milne Edwards*,	...	...	269
aubryi, A. Milne Edwards,	...	...	xxv, xxvii, xxx, xxxviii, xlviii, 271
HOLOTHURIOPHILUS, *Nauck*,	...	...	274
HUENIA, *de Haan*,	...	...	x, 34, 35
bifurcata, *Streets*,	...	...	35
brevirostrata, *Dana*,	...	...	35
depressa, *A. Milne Edwards*,	...	...	35
grandidieri, *A. Milne Edwards*,	...	...	35
pacifica, *Miers*,	...	...	35
proteus, *de Haan*,	...	...	xxv, xxvi, xxxv, xliii, 35
simplex, *Dana*,	...	...	35
HYAS, *Leach*,	...	...	x, 46, 62
aranea (*Linné*),	...	...	xix, xxxviii, xliv, 47
bufonius, *White*,	...	...	47, 48
coarctata, *Leach*,	...	...	xix, xxxviii, xliv, 47, 48
coarctata, var, *alutacea*, Brandt,	...	...	48
latifrons, Stimpson,	...	...	47, 48
lyrata, *Dana*,	...	...	47
serratus, Hailstone,	...	...	48
HYASTENUS, *White*,	...	...	x, 55, 56, 59, 61, 62
aries (*Latreille*),	...	...	56
convexus, *Miers*,	...	...	56
diacanthus (*de Haan*,)	...	...	xxvi, xxviii, xxxvi, xxxviii, xliv, 56, 57
elegans, *n. sp.*,	VI.	3	xxvi, xl, xliv, 56, 57, 58
gracilirostris, *Miers*,	...	...	56
japonicus, *Miers*,	...	...	56, 57
longipes (*Dana*),	...	...	56, 57
oryx, *A. Milne Edwards*,	...	...	xxvi, xxviii, xxxvi, xliv, 56, 57, 58, 59
ovatus (*Dana*),	...	...	56, 57
planasius (*Adams and White*),	...	...	xxvi, xxxviii, xliv, 56, 57
pleione (*Herbst*),	...	...	56
sebæ, *White*,	...	...	56
sinope, *Adams and White*,	...	...	56

HYASTENUS—*continued.*	Plate	Figure	Page
spinosus (*A. Milne Edwards*),	...	...	56, 57
verreauxii, *A. Milne Edwards*,	...	...	56
HYMENICINÆ, Dana,	...	...	xv, 275
HYMENICUS, *Dana*,	...	...	275, 280, 281
HYMENOSOMA, *Desmarest*,	...	...	xv, 275
HYMENOSOMA, *Leach*,	...	...	xv, 279, 280, 281
gaudichaudii, *Guérin-Méneville*,	...	...	280
geometricum, Stimpson,	...	...	280
orbiculare, *Desmarest*,	...	...	xxi, xxxviii xlix, 280
orbiculare, *Latreille*,	...	...	280
planatum, Haswell,	...	...	281
HYMENOSOMINÆ,	...	...	xv, 275, 279
HYPOPELTARIUM, *n. gen.*,	...	...	xiii, 210
spinosulum (*White*),	...	...	xxxii, xxxiii xxxvii, xxxix xlvii, 210, 211
HYPOPHTHALMUS, Richters,	...	...	223
ILIA, *Fabricius*,	...	...	298, 302
ILIACANTHA, *Stimpson*,	...	...	xvi, 298, 301
globosa, *Stimpson*,	...	...	302
intermedia, *n. sp.*,	XXVI.	3	xx, xxxviii xlix, 302
sparsa, *Stimpson*,	...	...	302
subglobosa, *Stimpson*,	...	...	302, 303
ILIINÆ,	...	...	xvi, 297
ILYOPLAX, *Stimpson*,	...	...	237
INACHIDÆ,	...	...	x, xliii, 2
INACHINÆ,	...	...	x, 11
INACHOIDES, *Milne Edwards*,	...	...	12
INACHUS, *Fabricius*,	...	...	x, 17, 18, 19, 27, 28, 33, 34
aguiarii, *B. Capello*,	...	...	19
arabicus, *Rüppell*,	...	...	19
australis, *Gray*,	...	...	19
dorhynchus, *Leach*,	...	...	19
dorsettensis (*Pennant*),	...	...	19
kämpferi, *de Haan*,	...	...	33
leptochirus, *Leach*,	...	...	xviii, xxxviii xliii, 19, 20
leptorhynchus, Desmarest,	...	...	19
leptorinchus, Milne Edwards,	...	...	20
mauritanicus, Lucas,	...	...	19
mauritanicus, var. *latus*, Brandt,	...	...	19
musivus, Otto,	...	...	55
thoracicus, *Roux*,	...	...	19
tuberculatus, *Lockington*,	...	...	19
IPHICULUS, *Adams and White*,	...	...	297, 298
IPHIS, Leach,	...	...	xvi, 298, 299, 300
septemspinosa, Leach,	...	...	300
septemspinosus, *Haswell*,	...	...	299
IXA, *Leach*,	...	...	xvi, 298, 300 301, 319
canaliculata, *Leach*,	...	...	301
cylindrus, *Fabricius*,	...	...	301

IXA—*continued.*	Plate	Figure	Page
cylindrus (*Fabricius*), var. megaspis,	...	...	xxviii, xxxviii xlix, 301
edwardsii, Lucas,	...	...	301
inermis, *Leach*,	...	...	301
megaspis, Adams and White,	...	...	301
KÄMPFERIA,	...	...	33
LAGOSTOMA nodosa, Randall,	...	...	137
LAHAINA, *Dana*,	...	...	x, 56
LAMBRUS, *Leach*,	...	...	xi, 91, 100, 102
LAMBRUS, *A. Milne Edwards*,	...	...	xi, 92
affinis, *A. Milne Edwards*,	...	...	xxv, xxxvi xliv, 94, 95, 96
agonus, *Stimpson*,	...	...	94
angulifrons (*Latreille*),	...	...	94
bicarinatus, *Miers*,	...	...	99
bouvieri, *A. Milne Edwards*,	...	...	93
calappoides (*Adams and White*),	...	...	xxiii, xxxvi xlv, 99, 101
carenatus, White,	...	...	93
contrarius (*Herbst*),	...	...	xxviii, xxxvi xliv, 93, 94, 95
crenulatus, Saussure,	...	...	93, 94
curvispinus, *Miers*,	...	...	93
deflexifrons, *Miers*,	...	...	94
depressioculus, *Stimpson*,	...	...	94
diacanthus, *de Haan*,	...	...	93
echinatus (*Herbst*),	...	...	93
erosus, *Miers*,	...	...	99
excavatus, *Stimpson*,	...	...	100
expansus, *Miers*,	...	...	xviii, xxxix xlv, 99, 100
fraterculus, *Stimpson*,	...	...	93
frons-acutis, *Lockington*,	...	...	100
gracilipes, *A. Milne Edwards*,	...	...	100
gracilis, *Dana*,	...	...	94
granulatus, *Kingsley*,	...	...	97
guérinii, F. de B. Capello,	...	...	xx, xxxvi xliv, 94, 96 97
guérinii, var. (?), *Capello*,	...	...	96
harpax, *Adams and White*,	...	...	99
holdsworthii, *Miers*,	...	...	93
hoplonotus, *Adams and White*,	...	...	xxv, xliv, xlv 98
hoplonotus, var. granulosus, *Miers*,	x.	5	xxv, xxxvi xlv, 98
hoplonotus, var. longioculis, *Miers*,	...	...	xxvi, xxxix xlv, 98, 99
hoplonotus, var. planifrons, *Miers*,	...	...	93
hyponcus, *Stimpson*,	...	...	94
intermedius, *Miers*,	x.	4	xxv, xxxvi xliv, 93, 95 96
laciniatus, *de Haan*,	...	...	93
lævicarpus, *Miers*,	...	...	93

LAMBRUS—*continued.*	Plate	Figure	Page
lamellifrons, Adams and White,	...	...	93
lamelliger, *White*,	...	...	93
longimanus (*Linné*),	...	...	xxvi, xxvii xxxix, xliv 93, 95
longispinus, *Miers*,	...	...	93
lupoides, White,	...	...	97
massena, *Roux*,	...	...	xviii, xxxix xlv, 99, 100
massena, *Roux*, var. atlanticus, *Miers*,	...	...	xviii, xxxvi xlv, 100
macrocheles (*Herbst*),	...	...	93
mediterraneus, Roux,	...	...	93
mossambicanus (*Bianconi*),	...	...	93
nodosus, *Jacquinot and Lucas*,	...	...	94, 96
pelagicus, *Rüppell*,	...	...	94
pisoides, *Adams and White*,	...	...	93
pourtalesii, *Stimpson*,	...	...	93
pugilator, *A. Milne Edwards*,	...	...	100
pulchellus, *A. Milne Edwards*,	...	...	99
rhombicus, *Dana*,	...	...	94
rugosus, Stimpson,	...	...	93, 99, 100
rugosus, var. *atlantica*, Miers,	...	...	99
rugosus, var. *goreensis*, Miers,	...	...	99
rumphii, Bleeker,	...	...	93
sandrockii, Haswell,	...	...	99
sculptus, *A. Milne Edwards*,	...	...	93
serratus, *Milne Edwards*,	...	...	xx, xxxvi xliv, 94, 97
setubalensis, *B. Capello*,	...	...	93
spinifer, Haswell,	...	...	93
spinimanus, Desmarest,	...	...	94, 95
tarpeius, *Adams and White*,	...	...	99
triangulus, *Stimpson*,	...	...	100
trigonus, *A. Milne Edwards*,	...	...	99
tuberculosus, *Stimpson*,	...	...	93
turriger, *White*,	...	...	xxvii, xxxvi xxxix, xliv 94, 96
validus, *de Haan*,	...	...	93
verrucosus, *Studer*,	...	...	93
whitei, *A. Milne Edwards*,	...	...	93
LEACHIUM orbiculare, MacLeay,	...	...	280
LEIOLAMBRUS, *A. Milne Edwards*,	...	...	92
LEIOLOPHUS, *Miers*,	...	...	271, 272
LEPIDONAXIA, *Targioni Tozzetti*,	...	...	56
LEPTODIUS, *A. Milne Edwards*,	...	...	xii, 108, 119 136, 137, 139
agassizii, *A. Milne Edwards*,	...	...	137
americanus (*Saussure*),	...	...	138
caribæus (*Desbonne and Schramm*),	...	...	137
convexus, *A. Milne Edwards*,	...	...	137
cooksoni, *Miers*,	...	...	136, 137

LEPTODIUS—*continued.*	Plate	Figure	Page
crassimanus, *A. Milne Edwards*,	...	...	137
dispar (*Stimpson*),	...	...	137
eudorus (*Herbst*),	...	...	137
exaratus (*Milne Edwards*),	...	...	137
exaratus, var. sanguineus (*Milne Edwards*),	...	...	xxviii, xxxvi xlv, 138
floridanus (*Gibbes*),	...	...	131, 137
gracilis (*Dana*),	...	...	137
hebes, *Stimpson*,	...	...	138
hombronii (*Jacquinot and Lucas*),	...	...	137
lividus (*de Haan*),	...	...	137
lobatus, *A. Milne Edwards*,	...	...	137
macandreæ, *Miers*,	...	...	136, 137
nudipes (*Dana*),	...	...	137
occidentalis (*Stimpson*),	...	...	137
punctatus, *Miers*,	...	...	xviii, xxxvi xlv, 136, 137 138
sternberghii, *Stimpson*,	...	...	138
LEPTOGRAPSUS, *Milne Edwards*,	...	...	xiv, 257, 260
bertheloti, *Milne Edwards*,	...	...	257
variegatus (*Fabricius*),	...	...	xxxii, xxxvii xlviii, 257
LEPTOPODIA, *Leach*,	...	...	x, 3, 4
modesta, *Milne Edwards*,	...	...	3
sagittaria (*Fabricius*),	...	...	xviii, xx, xxxv, xxxviii xl, xliii, 3, 4
sagittaria, Leach,	...	...	4
tenuirostris, Leach,	...	...	6
LEPTOPODIINÆ,	...	...	x, 3, 12
LEPTOPUS longipes, Latreille,	...	...	44
LEUCIPPE, *Milne Edwards*,	...	...	38
LEUCISCA, *MacLeay*,	...	...	303
LEUCOSIA, *Fabricius*,	...	...	xvi, 297, 320 321, 322
australiensis, *n. sp.*,	XXVII.	1	xxii, xxiii xxxviii, 1, 322
cheverti, *Haswell*,	...	...	322
craniolaris (*Linné*),	XXVII.	3	xxvi, xxvii xxx, xxxviii xxxix, l, 325 326
craniolaris, var. lævimana, *Miers*,	...	...	322, 325
fugax, Fabricius,	...	...	313
haswelli, *n. sp.*,	XXVII.	2	xxvi, xxix xxxviii, xxxix l, 322, 324
leslii, *Haswell*,	...	...	322
longifrons, *de Haan*,	...	...	323
neocaledonica, *A. Milne Edwards*,	...	...	323
ocellata, *Bell*,	...	...	xxvi, xxxix l, 323, 325
orbicularis, *Bell*,	...	...	321
pellida, *Bell*,	...	...	324

	Plate	Figure	Page
LEUCOSIA—*continued.*			
pulchcrrima, *Miers*,	...	...	332
reticulata, *Miers*,	...	...	322, 324, 325
reticulata, var. viridi-maculata, *Haswell*,	...	...	322
rhomboidalis, *de Haan*,	...	...	326
splendida, *Haswell*,	...	...	322, 323
urania, *Herbst*,	...	...	323
whitei, *Bell*,	...	...	xxvi, xxxix, l, 322, 325
LEUCOSIENS, Milne Edwards,	...	...	xvi, 297
LEUCOSIIDÆ,	...	...	xvi, xlix, 297
LEUCOSIIDEA,	...	...	xv, xlix, 282, 337
LEUCOSIINÆ,	...	...	xvi, 321
LEUCOSILIA, *Bell*,	...	...	303
LEUCOSOIDEA, Dana,	...	...	xv, 282
LIAGORE, *de Haan*,	...	...	107
rubromaculata, *de Haan*,	...	...	111
LIBIDOCLEA, *Milne Edwards and Lucas*,	...	...	72
brasiliensis (*Heller*),	...	...	73
coccinea, Dana,	...	...	73, 75
granaria, *Milne Edwards and Lucas*,	...	...	72
LIBINIA, *Leach*,	...	...	xi, 45, 72
affinis, Randall,	...	...	72
bidentata, *A. Milne Edwards*,	...	...	73
brasiliensis, *Heller*,	...	...	73
canaliculata, Say,	...	...	72
coccinea (*Dana*),	...	...	73, 75
distincta, Guérin-Méneville,	...	...	72
dubia, *Milne Edwards*,	...	...	72
emarginata, *Leach*,	...	...	72
expansa, *A. Milne Edwards*,	...	...	73
gibbosa, *A. Milne Edwards*,	...	...	73
gracilipes, *n. sp.*,	IX.	2	xxxii, xxxix, xliv, 73, 74
granaria, *Milne Edwards and Lucas*,	...	...	75
inflata, Streets,	...	...	72
rhomboidea, *Streets*,	...	...	72
rostrata, *Bell*,	...	...	73
semizonale, *Streets*,	...	...	73
setosa, *Lockington*,	...	...	73
smithii, *n. sp.*,	IX.	1	xxxii, xl, xliv, 73, 75
spinosa, *Milne Edwards*,	...	...	73, 75
subspinosa, *Streets*,	...	...	73
LIBYSTES, *A. Milne Edwards*,	...	...	223
LIOCARCINUS, Stimpson,	...	...	170, 199
LIOMERA, *Dana*,	...	...	119, 125, 127, 132, 133
lata, *Dana*,	...	...	125
LIRIOPEA, Nicolet,	...	...	xv, 275, 280
LISPOGNATHUS, *A. Milne Edwards*,	...	...	x, 12, 27
furcillatus, *A. Milne Edwards*,	...	...	28, 29
thomsoni (*Norman*),	v.	2	ii, xxi, xxii, xl, xliii, 28, 29
LISSA fissirostra, Say,	...	...	48
LISSOCARCINIENS, A. Milne Edwards,	...	...	170
LISSOCARCINUS, *Adams and White*,	...	...	xiii, 170, 192, 204, 205, 206
boholensis, *Semper et Nauck*,	...	...	205, 206
lævis, *n. sp.*,	XVII.	8	xxix, xxxvii, xlvii, 205, 206
orbicularis, *Dana*,	...	...	204, 205, 206
polybioides, *Adams and White*,	...	...	xxii, xxxvii, xlvii, 205, 206
LITHADIA, *Bell*,	...	...	xvi, 308, 318, 320
brasiliensis, *von Martens*,	...	...	318
cadaverosa, *Stimpson*,	...	...	318
cariosa, *Stimpson*,	...	...	318, 319
cariosa, *Stimpson*, var.,	XXVI.	2	xx, xxxviii, 318, 319
cubensis, *von Martens*,	...	...	318
cumingii, *Bell*,	...	...	318
granulosa, *A. Milne Edwards*,	...	...	319
laeunosa, *Kingsley*,	...	...	319
pontifera, *Stimpson*,	...	...	318
rotundata, *A. Milne Edwards*,	...	...	319
sculpta, *Haswell*,	...	...	318, 319
LITOCHEIRA, *Kinahan*,	...	...	xiv, 223, 231, 253
bispinosa, *Kinahan*,	...	...	232
kingsleyi, *Miers*,	XXI.	1	xxi, xl, xlviii, 232, 233
lævis (*Kingsley*),	...	...	232
LOBOPILUMNUS,	...	...	145
LOPHACTÆA, *A. Milne Edwards*,	...	...	*xii, 108, 113*
granulosa (*Rüppell*),	...	...	xxxi, xxxvi, xlv, 114
helleri, *Kossmann*,	...	...	113
lobata, *A. Milne Edwards*,	...	...	xix, xxxvi, xlv, 113, 114
picta, *A. Milne Edwards*,	...	...	113
rotundata (*Stimpson*),	...	...	113
violacea, *A. Milne Edwards*,	...	...	*113*
LOPHOPILUMNUS,	...	...	148
LOPHOS, de Haan,	...	...	xv, 283
lophos, de Haan,	...	...	286
LOPHOXANTHUS,	...	...	*114, 115, 124*
bellus (*Stimpson*),	...	...	*115, 116*
bellus, var. *leucomanus* (Lockington),	XI.	1	xxx, xxxix, xlv, 115
lamellipes (*Stimpson*),	...	...	115
sexdentatus, Miers,	...	...	115
LOPHOZOZYMUS, *A. Milne Edwards*,	...	...	xii, 108, 112, 113, 114, 115, 119, 134
bellus, var. leucomanus (*Lockington*),	XI.	1	xxx, xxxix, xlv, 115
epheliticus (*Linné*),	...	...	115
radiatus, *Milne Edwards*,	...	...	112

	Plate	Figure	Page
LOPHOZOZYMUS—*continued.*			
sexdentatus, *Miers*,	...	...	115
LUPA dufourii (Desmarest),	...	...	175
granulata, Milne Edwards,	...	...	180
pelagica, Audouin,	...	...	173
sanguinolenta, Milne Edwards,	...	...	174
LUPEÆNS, A. Milne Edwards,	...	...	169
LUPINÆ,	...	...	169, 171
LUPOCYCLIENS, A. Milne Edwards,	...	...	169
LUPOCYCLUS, *Adams and White*,	...	...	xiii, 169, 185
orientalis, *n. sp.*,	xvii.	1	xxvi, xxix, xl, xlvi, 186
philippinensis, *Nauck*,	...	...	186, 187
rotundatus, *Adams and White*,	...	...	186, 187
MACROCHEIRA, *de Haan*,	...	...	v, x, 33
kämpferi, *de Haan*,	...	...	xxx, xl, xliii, 33
MACROCŒLOMA, *Miers*,	...	...	xi, 76, 77, 79
camptocera, *Stimpson*,	...	...	79, 80
concava, *n. sp.*,	x.	2	xx, xxxvi, xliv, 79, 81, 82
diacantha (*A. Milne Edwards*),	...	...	79, 80
diplacantha (*Stimpson*),	...	...	79
eutheca (*Stimpson*),	...	...	80, 82
heptacantha, *Bell*,	...	...	79, 80
lævigata (*Stimpson*),	...	...	80
septemspinosa (*Stimpson*),	...	...	xx, xxxvi, xliv, 79, 80, 81
subparallela (*Stimpson*),	...	...	79, 81
trigona (*Dana*),	...	...	79
trispinosa (*Latreille*),	...	...	xix, xx, xxxvi, xliv, 79, 80
villosa (*Bell*),	...	...	79
MACROGRAPSUS, *n. gen.*,	...	...	262
orientalis, *n. sp.*,	...	...	262
MACROPHTHALMIDÆ, *Dana*,	...	...	xiv, 221
MACROPHTHALMINÆ,	...	...	237, 248
MACROPHTHALMUS, *Latreille*,	...	...	xiv, 237, 238, 241, 246, 248, 250, 251
bicarinatus, *Heller*,	...	...	249
boscii, Audouin,	...	...	252
brevis (*Herbst*),	...	...	249
carinimanus, *Latreille*,	...	...	249
convexus, *Stimpson*,	...	...	249
dentatus, *Stimpson*,	...	...	249
græffei, A. Milne Edwards,	...	...	249
grandidieri, *A. Milne Edwards*,	...	...	249
inermis, A. Milne Edwards,	...	...	249
lævis, *A. Milne Edwards*,	...	...	249
latifrons, *Haswell*,	...	...	249
latreillei, *Desmarest*,	...	...	249
podophthalmus, *Eydoux and Souleyet*,	...	...	xxv, xxvi, xxxvii, xlviii 249
polleni, *Hoffmann*,	...	...	249
punctulatus, *Miers*,	...	...	249, 251

	Plate	Figure	Page
MACROPHTHALMUS—*continued.*			
quadratus, *A. Milne Edwards*,	...	...	249, 251
serratus, *Adams and White*,	xx.	1	xxx, xxxvii, xlviii, 250
sulcatus, *Milne Edwards*,	...	...	249
MACROPODIA gracilis, Costa,	...	...	8
MAIA armata, Latreille,	...	...	55
glabra, Latreille,	...	...	42
longispina, de Haan,	...	...	53
lunulata, Risso,	...	...	43
rössellii, *Audouin*,	...	...	68
rostrata, Bosc,	...	...	55
MAIENS CRYPTOPHTHALMES, Milne Edwards,	...	...	x, xi
MAIIDÆ,	...	...	x, xliv, 43
MAIINÆ,	...	...	x, 43
MAIINEA,	...	...	x, 2
MAIOIDEA,	...	...	x, xliii, 2
MALACOSOMA, *de Man*,	...	...	274
MATUTA, *Fabricius*,	...	...	xv, 294, 337
banksii, *Leach*,	...	...	xxviii, xxxviii, xlix, 295
circulifera, *Miers*,	...	...	295
distinguenda, Hoffmann,	...	...	295
granulosa, *Miers*,	...	...	295
inermis, *Miers*,	...	...	xxv, xxxviii, xlix, 294, 296
lævidactyla, *Miers*,	...	...	xxiii, xxxviii, xlix, 296
lineifera, *Miers*, var.,	...	...	295
lunaris (*Herbst*),	...	...	295
lunaris, Miers,	...	...	295, 296
maculata, *Miers*,	...	...	295
obtusifrons, *Miers*, var. (?),	...	...	295
picta, *Herbst*,	...	...	295
planipes, Fabricius,	...	...	295
rubrolineata, Miers,	...	...	295
victor, Fabricius,	...	...	295
victrix, *Fabricius*,	...	...	xxviii, xxxviii, xlix, 295
victrix, var. crebrepunctata, *Miers*,	...	...	xxvii, xxxviii, xlix, 295
MATUTIDÆ,	...	...	xv, xlix, 293
MATUTINÆ,	...	...	xv, 294
MEDÆUS, *Dana*,	...	...	xii, 108, 116
elegans, *A. Milne Edwards*,	...	...	117, 118
granulatus, Miers,	...	...	118
haswelli, *n. sp.*,	xi.	2	xxii, xl, xlv, 117, 118
nodosus, *A. Milne Edwards*,	...	...	117
ornatus, *Dana*,	...	...	116, 117
simplex, *A. Milne Edwards*,	...	...	117
spinimanus (*Milne Edwards*),	...	...	117
MENÆTHIUS, *Milne Edwards*,	...	...	x, 36
angustus, Dana,	...	...	37
incisus, de Hæan,	...	...	40
monoceros (*Latreille*),	...	...	19, 37
monoceros (*Latreille*), var. angusta, *Dana*,	...	...	xxiii, xxv, xxxv, xliii, 37

	Plate	Figure	Page
MENÆTHIUS—*continued.*			
subserratus, *Adams and White*,	...	...	37
tuberculatus, *Adams and White*,	...	...	37
MENIPPE, *de Haan*,	...	...	141
MEROCRYPTUS, *A. Milne Edwards*,	...	...	xvi, 303, 319
lambriformis, *A. Milne Edwards*,	...	...	xxii, xxxix xl, l, 320
MESORHŒA, *Stimpson*,	...	...	92
METACARCINUS, *Milne Edwards*,	...	...	109
METAPLAX, *Milne Edwards*,	...	...	250
METOPOGRAPSUS, *Milne Edwards*,	...	...	xiv, 257, 259
messor (*Forskål*),	...	...	xxiv, xxxi xxxvii, xlviii 258
messor, var. frontalis, *Miers*,	...	...	xlviii, 258
METOPORAPHIS, *Stimpson*,	...	...	x, 4
calcarata (*Say*),	...	...	4
forficulatus, *A. Milne Edwards*,	...	...	xx, xxxv xxxviii, xl xliii, 4, 5
MICIPPA, *Leach*,	...	...	xi, 69
cristata (*Linné*),	...	...	69
curtispina, *Haswell*,	...	...	70
mascarenica, *Kossmann*,	...	...	69
philyra (*Herbst*),	...	...	69
spinosa, *Stimpson*,	VIII.	2	xxii, xxiii xxxvi, xliv, 70
spinosa, *var.* affinis, *Miers*,	VIII.	3	xxii, xxxix xliv, 70
thalia (*Herbst*),	...	...	70
MICIPPINÆ,	...	...	xi, 67
MICROHALIMUS, Haswell,	...	...	xi, 68
MICROPANOPE, *Stimpson*,	...	...	xii, 108, 130
lobifrons, *A. Milne Edwards*,	...	...	130
pugilator, *A. Milne Edwards*,	...	...	130
pusilla, *A. Milne Edwards*,	...	...	130
sculptipes, *Stimpson*,	...	...	130
spinipes, *A. Milne Edwards*,	...	...	xx, xxxvi xlv, 130
MICROPISA, *Stimpson*,	...	...	x, 49
ovata, Stimpson,	...	...	50
violacea, A. Milne Edwards,	...	...	50
MICROPHRYS, *Milne Edwards*,	...	...	xi, xl, 82
aculeatus, *Bell*,	...	...	83
bicornutus (*Latreille*),	...	...	xix, xxxvi xliv, 83
depressa (*Lockington*),	...	...	83
error, *Kingsley*,	...	...	83
platisoma (*Stimpson*),	...	...	83
tumidus (*Lockington*)	...	...	83
weddelliii, *Milne Edwards*,	...	...	83
MICTYRIS longicarpus, Latreille,	...	...	278
MILNIA, Stimpson,	...	...	xi
MITHRACINÆ,	...	...	xi, 84
MITHRACULUS, *Miers*,	...	...	xi, 85, 89
MITHRACULUS, *White*,	...	...	87, 89

	Plate	Figure	Page
MITHRACULUS—*continued.*			
coronatus, White,	...	...	89
forceps, A. Milne Edwards,	...	...	88
hirsutipes, *Kingsley*,	...	...	90
sculptus, *Lamarck*,	...	...	xx, 90
MITHRAX, *Leach*,	...	...	xi, 84, 85
aculeatus (*Herbst*),	...	...	86
acuticornis, *Stimpson*,	...	...	86, 88
affinis, F. de B. Capello,	...	...	67
affinis, Desbonne and Schramm,	...	...	87
areolatus, *Lockington*,	...	...	87
armatus, *Saussure*,	...	...	86
asper, Milne Edwards,	...	...	67
belli, Gerstæcker,	...	...	86
cinctimanus, *Stimpson*,	...	...	87
cornutus (*Saussure*),	...	...	xx, xxxvi, xliv, 86, 87, 88
coronatus (*Herbst*),	...	...	xx, xxxvi xliv, 87, 89
cristulipes (*Stimpson*),	...	...	87
denticulatus, *Bell*,	...	...	87
depressus, *A. Milne Edwards*,	...	...	86
forceps (*A. Milne Edwards*),	...	...	xix, xx, xxxvi xliv, 87, 88
hirsutipes, *Kingsley*,	...	...	87, 90
hispidus (*Herbst*),	...	...	86
hispidus, Milne Edwards,	...	...	88
hispidus, *var.* pleuracanthus, *Stimpson*,	...	...	xx, xxxix, xl xliv, 88
holderi, *Stimpson*,	...	...	86
lævimanus, *Desbonne and Schramm*,	...	...	86
leucomelas, *Desbonne and Schramm*,	...	...	86
minutus, *Saussure*,	...	...	87
nodosus, *Bell*,	...	...	87
nudus, *A. Milne Edwards*,	...	...	87
pleuracanthus, Stimpson,	...	...	86, 88
pygmæus, *Bell*,	...	...	86
quadridentatus, MacLeay,	...	...	67
rostrata (*A. Milne Edwards*),	...	...	xix, xxxvi xliv, 85
rostratus, *Bell*,	...	...	86
ruber, *A. Milne Edwards*,	...	...	87
sculptus, *Lamarck*,	...	...	xx, 87
sp.,	x.	3	xx, xliv, 89
spinifrons, A. Milne Edwards,	...	...	67
spinosissimus (*Lamarck*),	...	...	86
spinosissimus, *Saussure*,	...	...	88
triangularis, Kossmann,	...	...	67
triangularis, var. *africanus*, Kossmann,	...	...	67
triangularis, var. *indicus*, Kossmann,	...	...	67
triangulatus, *Lockington*,	...	...	86
trispinosus, *Kingsley*,	...	...	86
tuberculatus, *Stimpson*,	...	...	86
ursus, *Bell*,	...	...	86, 90

	Plate	Figure	Page
MITHRAX—*continued.*			
verrucosus, *Milne Edwards*,	...	...	86
MURCIA, *Leach*,	...	...	290
cristata, Leach,	...	...	293
MURSIA, *Desmarest*,	...	...	xv, 283, 289, 290, 293
acanthophora (*Lucas*),	...	...	290
armata, de Haan,	...	...	290, 291, 292
cristata, Milne Edwards,	...	...	291
cristata, White,	...	...	293
cristimana, *de Haan*,	...	...	xxi, xxxviii, xl, xlix, 291
curtispina, *n. sp.*,	xxiv.	2	xxiv, xl, xlix, 291
mains en crête, Desmarest,	...	...	291
MYCTERINÆ,	...	...	xv, 275, 278
MYCTERIS, *Latreille*,	...	...	ix, xv, 274, 275, 278, 279
brevidactylus, Stimpson,	...	...	278
deflexifrons,	...	...	278
longicarpus, *Latreille*,	...	...	xxv, xxxviii, xlix, 278
longicarpus, *Wilde*,	...	...	278
longicarpus, Haswell,	...	...	278
platycheles, *Milne Edwards*,	...	...	xxii, xxxviii, xlix, 278, 279
subverrucatus, White,	...	...	278, 279
MYRA, *Leach*,	...	...	xvi, 297, 298, 301, 303, 311, 312, 313
affinis, *Bell*,	...	...	xxv, xxxviii, l, 315
australis, *Haswell*,	...	...	xxv, xxxviii, l, 313, 315
carinata, Bell,	...	...	313
coalita, Hilgendorf,	...	...	313, 314
darnleyensis, *Haswell*,	...	...	xxix, xxxviii, l, 313, 315, 316
dilatimanus, White,	...	...	298
dubia, Miers,	...	...	313, 314
eudactyla, Bell,	...	...	298
fugax (*Fabricius*),	...	...	xxvi, xxxix, xlix, 313, 314
mammillaris, *Bell*,	...	...	315, 316
punctata, Hilgendorf,	...	...	313
subgranulata, Kossmann,	...	...	313
MYRODES, *Bell*,	...	...	xvi, 297, 298, 313
eudactylus, *Bell*,	...	...	xxvi, xxxix, xlix, 298
gigas, Haswell,	...	...	298
MYROPSIS, *Stimpson*,	...	...	298, 302
NAUTILOGRAPSUS, *Milne Edwards*,	...	...	xiv, 253
minutus (*Linné*),	...	...	xli, xlviii, 175, 254
NAXIA, *Milne Edwards*,	...	...	x, 59, 61
diacantha, de Haan,	...	...	57
hirta (*A. Milne Edwards*),	....	...	xxviii, xxxvi, xliv, 60, 61

	Figure	Plate	Page
NAXIA—*continued.*			
hystrix, *n. sp.*,	VI.	4	xxvii, xl, xliv, 60
robillardi, *Miers*,	...	...	60, 61
serpulifera, *Milne Edwards*,	...	...	60
NAXIOIDES, A. Milne Edwards,	...	...	x, 61
hirta, A. Milne Edwards,	...	...	61
robillardi, *Miers*,	...	...	61
NECTOCARCINUS, *A. Milne Edwards*,	...	...	170
NECTOGRAPSUS, Heller,	...	...	265
politus, Heller,	...	...	266
NEMAUSA, *A. Milne Edwards*,	...	...	xi, 85
rostrata, *A. Milne Edwards*,	...	...	xix, xxxvi, xliv, 85
spinipes (*Bell*),	...	...	85
NEPTUNES ANGULAIRES, A. Milne Edwards,	...	...	174
ARQUÉS, A. Milne Edwards,	...	...	172
NEPTUNUS, *de Haan*,	...	...	xiii, 169, 171, 172, 174, 175, 182, 183, 184, 193
acuminatus (*Stimpson*),	...	...	174
amnicola, *Rochebrune*,	...	...	175
argentatus, A. Milne Edwards,	...	...	177, 178
depressifrons (*Stimpson*),	...	...	xix, xxxvii, xlvi, 181, 182
edwardsii, *Rochebrune*,	...	...	175
exasperatus (*Gerstæcker*),	...	...	174
gibbesii (*Stimpson*),	...	...	181
gladiator (*Fabricius*),	...	...	xxvi, xxxix, xlvi, 177, 178
gladiator, var. argentatus (*White*),	...	...	xxix, xxxvii, xlvi, 177
granulatus (*Milne Edwards*),	...	...	xxviii, xxx, xxxvii, xxxix, xlvi, 180, 181
hastatoides (*Fabricius*),	...	...	xxvi, xxvii, xxx, xxxi, xxxvii, xxxix, xlvi, 175, 178
hastatus (*Linné*),	...	...	xvii, xxxix, xlvi, 175
inæqualis, *Miers*,	...	...	175
longispinosus, A. Milne Edwards,	...	...	183
madagascariensis, *Hoffmann*,	...	...	172
mexicanus (*Gerstæcker*),	...	...	172
pallidus, *Rochebrune*,	...	...	175
panamensis (*Stimpson*),	...	...	174
pelagicus (*Linné*),	...	...	xxviii, xxxvii, xlvi, 172, 173
pudica (*Gerstæcker*),	...	...	172
rugosus, *A. Milne Edwards*,	...	...	xxv, xxviii, xxix, xxxvii, xlvi, 176, 177
sanguinolentus (*Herbst*),	...	...	xxii, xxvii, xxxi, xxxvii, xlvi, 174

NEPTUNUS—*continued.*	Plate	Figure	Page
sayi, *A. Milne Edwards*,	...	...	xix, xxxix, xli, xlvi, 172, 173
sebæ (*Milne Edwards*),	...	...	179
sieboldi, A. Milne Edwards,	...	...	172
spinicarpus (*Stimpson*),	...	...	xx, xl, xlvi, 172, 182
spinimanus, *Latreille*,	...	...	180
spinipes, *n. sp.*,	xv.	1	xxviii, xxxvii, xlvi, 175, 178
sulcatus, *A. Milne Edwards*,	...	...	175
tenuipes, *de Haan*,	...	...	176, 177
tomentosus, *Haswell*,	...	...	175
transversus (*Stimpson*),	...	...	174
trituberculatus, *Miers*,	...	...	172
tuberculosus, A. Milne Edwards,	...	...	xxvii, xxxvii, xlvi, 176
tumidulus (*Stimpson*),	...	...	174
unispinosus (*Miers*),	...	...	xxv, xxxvii, xlvi, 179, 180
ventralis, *A. Milne Edwards*,	...	...	174
vigilans, A. Milne Edwards,	...	...	183
vocans, *A. Milne Edwards*,	...	...	174
whitei (*A. Milne Edwards*),	...	...	xxvi, xxxix, xlvi, 179
NOTOLOPAS, *Stimpson*,	...	...	x, 64
brasiliensis, *n. sp.*,	VIII.	1	xx, xxxvi, xliv, 64, 66
lamellatus, *Stimpson*,	...	...	64, 65
NOTONYX, *A. Milne Edwards*,	..	...	xiv, 223, 235, 236
nitidus, *A. Milne Edwards*,	...	...	xxvi, xxxix, xlviii, 236
NUCIA, *Dana*,	...	...	303
NURSIA, *Leach*,	...	...	303, 304, 305, 306
NURSILIA, *Bell*,	...	...	297, 298
OCÆANUS, de Haan,	...	...	170, 189
OCYPODA, *Fabricius*,	...	...	xiv, 237, 239
ægyptiaca, Gerstæcker,	...	...	238
arenaria (*Catesby*),	...	...	xix, xx, xxxvii, xlviii, 240
brevicornis, *Milne Edwards*,	...	...	239
ceratophthalma (*Pallas*),	...	...	xxiv, xxv, xxvii, xxviii, xxxvii, xlviii, 238, 239
cordimana, *Desmarest*,	...	...	238
cursor (*Linné*),	...	...	xviii, xix, xxxvii, xlviii, 240
ippeus, Olivier, &c.,	...	...	240
kuhlii, *de Haan*,	...	...	239
macrocera, *Milne Edwards*,	...	...	239
rhombea, Milne Edwards,	...	...	240
OCYPODIACEÆ, Milne Edwards,	...	...	221
OCYPODIDÆ, Milne Edwards,	...	...	xiv, xlviii, 216, 221

	Plate	Figure	Page
OCYPODIENS, Milne Edwards,	...	...	xiv, 221, 236
OCYPODIIDEA,	...	...	xiv, xlvii, 216
OCYPODINÆ,	...	...	xiv, 236, 237
ŒIDEA, de Haan,	...	...	211
viginti-spinosa,	...	...	212
ŒTHRA, *Leach*,	...	..	106, 107
OMALACANTHA hirsuta, Streets,	...	...	88
OMMATOCARCINUS, *White*,	...	...	xiv, 237, 245, 246, 247
macgillivrayi, *White*,	...	...	xxiii, xxxvii, xlviii, 247
ONCINOPUS, *de Haan*,	...	...	v, x, 20
aranea, *de Haan*,	...	...	xxii, xxvi, xxvii, xxxv, xli, xliii, 20
ONYCHOMORPHA, *Stimpson*,	...	...	303
ORBICULATA, Latreille,	...	...	xv, 282
OREOPHORUS, *Rüppell*,	...	...	297, 318, 320
ORITHYIA, *Fabricius*,	...	...	283
ORITHYINÆ,	...	...	283
ORTHOGRAPSUS, Kingsley,	...	...	260
OSACHILA, *Stimpson*,	...	...	294, 318
OSTRACOTHERES, *Milne Edwards*,	...	...	274
OTHONIA, *Bell*,	...	...	84
OXYPLEUROPON, *n. gen.*,	...	...	x, 34, 38
stimpsoni, *n. sp.*,	VI.	1	xxvi, xxix, xl, xliii, 38, 62
OXYRHYNCHA,	...	...	x, xliii, 2
OXYRHYNCHI, Latreille,	...	...	x, 2
OXYRHINQUES, Milne Edwards,	...	...	x, 2
OXYSTOMATA,	...	...	xv, xlix, 282, 337
OXYSTOMES, Milne Edwards,	...	...	xv, 282
OZIUS subverrucosus, White,	...	...	129
PACHYGRAPSUS, *Randall*,	...	...	xiv, 258, 259, 260, 261
æthiopicus, Hilgendorf,	...	...	258
crassipes, *Randall*,	...	...	261
latipes,	...	...	259
maurus (*Lucas*),	...	...	259
marmoratus, *Fabricius*,	...	...	259
pubescens, *Heller*,	...	...	259
transversus, *Gibbes*,	...	...	xviii, xix, xxiii, xxxvii, xlviii, 259
PACHYSTOMUM, *Nauck*,	...	...	262
PAGURUS maculatus, Catesby,	...	...	255
PANOPEUS, *Milne Edwards*,	...	...	xii, 108, 124, 128, 149, 222
acutidens, *Haswell*,	...	...	129
affinis, Streets and Kingsley,	...	...	140
africanus, *A. Milne Edwards*,	...	...	129
blanchardi, *A. Milne Edwards*,	...	...	129
herbstii var. serratus,	...	...	xix, xxxvi, xlv, 129
lævis, *Dana*,	...	...	129
packardi, *Kingsley*,	...	...	129
serratus, Saussure,	...	...	129
subverrucosus, *White*,	...	...	129

	Plate	Figure	Page
PANOPEUS—*continued.*			
xanthiformis, *A. Milne Edwards*,	...	...	129
PANOPLAX, *Stimpson*,	...	...	222
PARACYCLOÏS, *n. gen.*,	...	...	xv, 283, 288 290
milne-edwardsii, *n. sp.*,	XXIV.	1	xxix, xl, xlix 289
PARAGRAPSUS, *Milne Edwards*,	...	...	268
PARAMICIPPA affinis, Miers,	...	...	70
spinosa, Miers,	...	...	70
PARAMITHRAX, *Milne Edwards*,	...	...	52
coppingeri, Haswell,	...	...	52, 53
halimoides, Miers,	...	...	53
spatulifer, Haswell,	...	...	52
PARAPILUMNUS, Kossmann,	...	...	145
PARATHRANITES, *sub. gen. nov.*	...	...	xiii, 169, 185
orientalis, n. sp.,	...	...	xxvi, xxix, xl xlvi, 186
PARAXANTHUS, *Milne Edwards and Lucas*,	...	...	125
PARTHENOLAMBRUS, *A. Milne Edwards*,	...	...	xi, xii, 92, 99
calappoides (*Adams and White*),	...	...	xxiii, xxxvi xlv, 101
expansus, Miers,	...	...	xviii, xxxix xlv, 100
massena,	...	...	xviii, xxxvi xxxix, xlv, 100
massena, var. *atlanticus*,	...	...	xviii, xxxvi xlv, 100
PARTHENOPE calappoides, Adams and White,	...	...	101
contracta, Costa,	...	...	99
fornicata, de Haan,	...	...	102
longimana, Costa,	...	...	94
sandrockii, Haswell,	...	...	99
PARTHENOPIDÆ,	...	...	xi, xliv, 91
PARTHENOPIENS, M. Edwards,	...	...	xi
PARTHENOPINÆ,	...	...	xi, 91
PARTHENOPINEA,	...	...	xi, 91
PARTHENOPOIDES, *Miers*,	...	...	xi, xii, 92, 99
expansus, Miers,	...	...	100
massena, Miers,	...	...	100
PELTARION, Jacquinot and Lucas,	...	...	xiii, 210
magellanicus, Jacquinot and Lucas,	...	...	211
spinulosum, White,	...	...	211
PELTINIA, *Dana*,	...	...	40
PERICERA, *Latreille*,	...	...	xi, xii, 76, 77, 79
cœlata, *A. Milne Edwards*,	...	...	76
cornuta, *Milne Edwards*,	...	...	xxi, xxxvi xliv, 76
cornuta (*Herbst*),	...	...	76
curvicorna, Desbonne and Schramm,	...	...	80
			82
eutheca, Stimpson,	...	...	79
fossata, Stimpson,	...	...	81
heptacantha, Bell,	...	...	

	Plate	Figure	Page
PERICERA—*continued.*			
nodipes, Desbonne and Schramm,	...	...	79
ovata, *Bell*,	...	...	76
septemspinosa, Stimpson,	...	...	80
spinosissima, *Saussure*,	...	...	76
trispinosa, Milne Edwards,	...	...	80
vilpinia, Desbonne and Schramm,	...	...	79
PERICERIDÆ,	...	...	xi, xliv, 71
PERICERINÆ,	...	...	xi, 71
PERINIA, Dana,	...	...	xi
PERSEPHONA, *Leach*,	...	...	xvi, 298, 301 303, 311
guaia, Bell,	...	...	312
lichtensteinei, *Leach*,	...	...	312
punctata (*Browne*),	XXV.	5	xx, xxxviii xlix, 312
punctata, Stimpson,	...	...	312
tuberculosa, A. Milne Edwards,	...	...	306, 312
PHILYRA, *Leach*,	...	...	xvi, 303, 320 321
cristata, *Miers*,	...	...	321
lævidorsalis, *Miers*,	...	...	321
longimana, *A. Milne Edwards*,	...	...	321
marginata, *A. Milne Edwards*,	...	...	321
platycheira, *de Haan*,	...	...	xxii, xxxviii l, 321
rectangularis, *Miers*,	...	...	321
rudis, *Miers*,	...	...	321
tuberculosa, *Stimpson*,	...	...	321
unidentata, *Stimpson*,	...	...	321
variegata (*Büppelt*),	...	...	321
PHLYXIA, *Bell*,	...	...	303, 304, 305
PHLYXIA, Leach,	...	...	xvi, 303
crassipes, *Bell*,	...	..	xx, xxii, xxiii xxxviii, xxxix, xlix 307, 308, 309
dentifrons, n. sp.,	XXV	4	xxii, xxxviii xlix, 310
granulosa, Haswell,	...	...	306, 310
intermedia, *n. sp.*,	XXV	2	xxi, xxxix xlix, 308
lambriformis, Bell,	...	...	306
lævis, Bell,	...	...	306
orbicularis, Haswell,	...	...	308, 309
petleyi, Haswell,	...	...	305
quadridentata, Stimpson,	...	...	309
quadridentata, *Gray*, var. spinifera, *nov.*,	XXV	3	xxiii, xxxviii xlix, 309 310
undecimspinosa (Kinahan), var. orbicularis,	...	..	xxii, xxiii xxxviii, xlix 309
PHYMODIUS, *A. Milne Edwards*,	...	...	xii, 108, 136 139

PHYMODIUS—*continued.*	Plate	Figure	Page
maculatus (*Stimpson*), .	...	...	139
monticulosis (Dana), .	...	...	xxviii, xxxvi xlv, 139, 140
obscurus, A. Milne Edwards,	...	...	139
rugipes (*Heller*), . .	...	...	139
ungulatus (*Milne Edwards*),	...	...	139, 140
ungulatus, var. curtimanus, *Dana*, .	...	...	139
ungulatus, var. gracilis, *Dana*,	...	...	139
PICROCEROIDES, *n. gen.*, . .	...	...	xi, 71, 77
tubularis, *n. sp.*, . .	X.	1	xx, xxxvi xliv, 77
PILUMNOPEUS, A. Milne Edwards,	...	...	144, 148
PILUMNOPLAX, *Stimpson*, .	...	...	xiv, 146, 223 224, 225, 227
abyssicola, *n. sp.*, . .	XIX.	2	xxiv, xl xlviii, 226 227, 228
ciliata, *Stimpson*, . .	...	...	226
heterochir (*Studer*), .	XIX.	1	xxi, xl, xlviii 226, 227
longipes, *Stimpson*, .	...	...	226
normanni, Miers, . .	...	...	227, 228
sculpta, *Stimpson*, .	...	...	226
sulcatifrons, *Stimpson*, .	...	...	226
sulcatifrons, var. atlantica, *Miers*, ...	...	...	226
sulcatifrons, var. australiensis, *Miers*, .	...	...	226
vestita (*de Haan*), . .	...	...	227
vestita, var. sexdentata (*Haswell*), . .	...	...	xxx, xxxi xxxvii, xlviii 227. 229
PILUMNUS, *Leach*, . . .	...	...	xii, 109, 130 144, 145, 146 147, 149, 153 226, 227
actumnoides, A. Milne Edwards, . .	...	...	149
aculeatus (*Say*), . .	...	...	147, 151, 152
affinis, *Capello*, . .	...	...	146
africanus, *A. Milne Edwards*, . .	XIII.	1	xviii, xxxvi xlv, 146, 150
asper (*Rüppell*), . .	...	...	148
barbatus, *A. Milne Edwards*,	...	...	149
bleekeri, *Miers*, . .	...	...	149
brachytrichus, *Kossmann*,	...	...	149
brasiliensis, *n. sp.*, .	XIII.	2	xx, xxxvi xlv, 147, 151
calculosus, *Dana*, . .	...	...	146
caribæus, *Desbonne and Schramm*, . .	...	...	147, 152
cærulescens, *A. Milne Edwards*, . .	...	...	149
cristimanus, *A. Milne Edwards*, . .	..	...	149
cursor, *A. Milne Edwards*,	...	...	149
dasypodus, *Kingsley*, .	...	...	147
deflexus, *A. Milne Edwards*,	...	...	149

PILUMNUS—*continued.*	Plate	Figure	Page
dehaani, *Miers*, . .	XIV.	1	xxviii, xxxvi xlvi, 149, 155
depressus, *Stimpson*, .	...	...	147
dilatipes, *Adams and White*,	...	...	148, 156
dorsipes, *Stimpson*, .	...	...	148, 159
elatus, *A. Milne Edwards*,	...	...	148
fissifrons, *Stimpson*, .	...	...	148
fimbriatus, *Milne Edwards*,	...	...	149
floridanus, *Stimpson*, .	XIII.	3	xx, xxxix, xl xlv, 130, 147 152
forficigerus, *Stimpson*, .	...	...	148, 155
forskålii, *Milne Edwards*,	...	. .	148
fragifer, *A. Milne Edwards*,	...	...	148
fragosus, A. Milne Edwards,	...	...	xx, xxxvi xlvi, 130, 147 153
fragosus, var., *A. Milne Edwards*, . .	...	...	153
gemmatus, *Stimpson*, .	...	...	147
glaberrimus, *Haswell*, .	...	...	149
globosus, *Dana*, . .	...	...	xxx, xxxix xlvi, 148, 155
gracilipes, *A. Milne Edwards*,	...	...	147, 152
granulatus, *Krauss*, .	...	...	147
granulimanus, *Stimpson*,	...	...	147
heterochir, Studer, .	...	...	227
hirsutus, Stimpson, .	...	...	148, 154
hirtellus (*Linné*), . .	...	...	146, 150
inermis, *Haswell*, . .	...	...	149
integer, *Haswell*, . .	...	...	149
labyrinthicus, *Miers*, .	...	...	xxv, xxxvii xlvi, 149, 161
lacteus, *Stimpson*, . .	...	...	147, 153
lævimanus, *Dana*, .	...	...	148
lævis, *Dana*, . .	...	...	148
lanatus, *Latreille*, . .	...	...	148
lapillimanus, *Stimpson*, .	...	...	148
limosus, *Smith*, . .	...	..	147
longicornis, *Hilgendorf*,	...	...	149, 156, 157
longicornis, *Hilgendorf*, var.,	...	...	xxiii, xxxvi xlvi, 157
longipes, *A. Milne Edwards*,	...	...	149
marginatus, Stimpson, .	...	...	147, 148
melanacanthus, *Kingsley*,	...	...	147
miersii, *A. Milne Edwards*,	...	...	147, 153
minutus, *de Haan*, .	...	...	148, 154
minutus, *de Haan*, var. hirsutus, . .	...	...	xxx, xxxix xlvi, 154
monilifera, *Haswell*, .	...	...	149
mus, Dana, . . .	...	...	148
nitidus, *A. Milne Edwards*,	...	...	149
normani, *n. sp.*, , .	XIV.	2	xxvi, xl, xlvi 149, 156, 157
nudifrons, *Stimpson*, .	...	...	147
ovalis, *A. Milne Edwards*,	...	...	148
peronii, *Milne Edwards*,	...	...	148
pugilator (*A. Milne Edwards*), . . .	...	...	148

PILUMNUS—*continued.*	Plate	Figure	Page
pulcher, *Miers*,	...	...	xxv, xxxvii, xlvi, 149, 161
purpureus, *A. Milne Edwards*,	...	...	149, 157
quoyi, *Milne Edwards*,	...	...	147, 152, 153
reticulatus, *Stimpson*,	...	...	147
rufopunctatus, *Stimpson*,	xiv.	5	xxii, xxxvii, xlvi, 148, 160
savignyi, *Heller*,	...	...	149, 150
scabriusculus, *Adams and White*,	..	...	xxviii, xxxvi, xlvi, 148, 155, 156, 158
semilanatus, *Miers*,	...	...	149
seminudus, *Miers*,	...	...	xxv, xxxvii, xlvi, 149, 161
spinifer, *Milne Edwards*,	...	...	xviii, xxxix, xlv, 146, 150
spinohirsutus (*Lockington*),	...	...	147
spinulosus, Kessler,	...	...	146
squamosus, *de Haan*,	...	...	155
stimpsonii, *Miers*,	...	...	147
teixeirianus, *Capello*,	...	...	146
tenellus, *Dana*,	...	...	148
terræ-reginæ, *Haswell*,	...	...	149
tessellatus, *A. Milne Edwards*,	...	...	147
tomentosus, *Latreille*,	xiv.	4	xxi, xxii, xxxix, xlvi, 148, 149, 160
tridentatus, *Maitland*,	...	...	146, 149, 227
urinator, *A. Milne Edwards*,	...	...	147
ursulus, Adams and White,	...	...	148
vanquelinii (*Audouin*),	...	...	149
vermiculatus, *A. Milne Edwards*,	...	...	149
verrucosipes, *Stimpson*,	...	...	146
vespertilio (*Fabricius*),	...	...	148
vestitus, *Haswell*,	xiv.	3	xxiii, xxxvi, xlvi, 149, 159
villosus, *Risso*,	...	...	146, 150
vinaceus, *A. Milne Edwards*,	...	...	147, 152
xanthoides, *Krauss*,	...	...	147
xantusii, *Stimpson*,	...	...	147
PINNAXODES, *Heller*,	...	...	274
PINNIXA, *White*,	...	...	274, 275
PINNOTHERA, Dana,	...	...	275
PINNOTHERELIA, *Lucas*,	...	...	274
PINNOTHERES, *Latreille*,	...	...	xv, 274, 275
angelicus, *Lockington*,	...	...	276
ascidiicola, *Hesse*,	...	...	276
boninensis, *Stimpson*,	...	...	276
byssomiæ, *Say*,	...	...	276
depressum, *Say*,	...	...	276
flavus, *Nauck*,	...	...	276
lithodomi, *Smith*,	...	...	276
maculatum, *Say*,	...	...	276
margarita, *Smith*,	...	...	276
monodactylum, *Say*,	...	...	276

PINNOTHERES—*continued.*	Plate	Figure	Page
obscurus, *Stimpson*,	...	...	276
parvulus, *Stimpson*,	...	...	2
pectunculi, *Hesse*,	...	...	276
pholadis, *de Haan*,	...	...	276
villosulus, *Guérin-Méneville*,	xxii.	2	xxiii, xxv, xxxviii, xlix, 277
PINNOTHERIDÆ,	...	...	xv, xlix, 274
PINNOTHERIENS, Milne Edwards,	...	...	xv, 274
PINNOTHERINÆ,	...	...	xv, 274, 275
PIRIMELA, *Leach*,	...	...	107
PISA, *Leach*,	...	...	x, 53, 54, 55, 59
acutifrons, *A. Milne Edwards*,	...	...	54
antilocapra, *Stimpson*,	...	...	54
armata, Milne Edwards,	...	...	55
bicornuta, Latreille,	...	...	83
brevicornis, *A. Milne Edwards*,	...	...	54
carinimanus, *Miers*,	...	...	54
convexa, Brandt,	...	...	54
corallina, Risso,	...	...	54
erinacea, *A. Milne Edwards*,	...	...	54
fasicularis, *Krauss*,	...	...	56
galibica, Desbonne and Schramm,	...	...	83
gibbsii, Leach,	...	...	55
hirticornis (*Herbst*),	...	...	54
nodipes, Leach,	...	...	55
planasia, Adams and White,	...	...	57
prælonga, *Stimpson*,	...	...	54
purpurea, Desbonne and Schramm,	...	...	83
quadricornis, Brandt,	...	...	54
tetraodon (*Pennant*),	...	...	54
tribulus (*Linné*),	...	...	xvii, xviii, xxxviii, xliv, 54, 55
trispinosa, Latreille,	...	...	80
PISOIDES celatus, Lockington,	...	...	83
tenuidus, Lockington,	...	...	83
PISOLAMBRUS, *A. Milne Edwards*,	...	...	92
PLAGUSETES, Heller,	...	...	208
elatus, *Heller*,	...	...	209
PLAGUSIA, *Latreille*,	...	...	xv, 271
chabrus (*Linné*),	xxii.	1*d*	xxi, xxxviii, xlviii, 273
depressa (*Fabricius*),	...	...	xviii, xxxviii, xlviii, 272, 273
immaculata, *Lamarck*,	xxii.	1	xxix, xxxviii, xlviii, 273
speciosa, *Dana*,	...	...	273
tomentosa, Milne Edwards,	...	...	273
tuberculata, Lamarck,	...	...	272
PLAGUSIINÆ,	...	...	xv, 271
PLANES, Leach,	...	...	253
PLATYGRAPSUS, *Stimpson*,	...	...	xiv, 263, 264

PLATYGRAPSUS—*continued.*	Plate	Figure	Page
depressus (*de Haan*),	...	...	xxx, xxxix, xlviii, 263
PLATYLAMBRUS, Stimpson,	...	...	xi, 92
PLATYLAMBRUS, *A. Milne Edwards*,	...	...	92, 97
serratus, A. Milne Edwards,	...	...	97
PLATYMAIA, *n. gen.*,	...	...	x, 12
wyville-thomsoni, *n. sp.*,	II.	1	xxix, xl, xliii, 13
PLATYMERA, *Milne Edwards*,	...	...	283, 288, 291
PLATYNOTUS, de Haan,	...	...	263
depressus, de Haan,	...	...	263
PLATYONYCHIDÆ, Dana,	...	...	xiii, 169
PLATYONYCHUS, *Latreille*,	...	...	xiii, 170, 201, 204
bipustulatus, *Milne Edwards*,	...	...	xxii, xxxvii, xlvii, 186, 202, 203, 204
iridescens, *n. sp.*,	xvii.	2	xxvi, xl, xlvii, 202
ocellatus (*Herbst*),	...	...	201, 202, 203, 204
purpureus, Dana,	...	...	202
PLISTACANTHA, *Miers*,	...	...	32
PODOCHELA, *Stimpson*,	...	...	x, 10, 11
reisei, A. Milne Edwards,	...	...	11
riisei (*Stimpson*),	...	...	xix, xx, xxxv, xxxviii, xl, xliii, 11
vestita, *Stimpson*,	...	...	11
PODONEMA, Stimpson,	...	...	x, 11
riisei, Stimpson,	...	...	11
PODOPHTHALMINÆ,	...	...	xiii, 169, 206
PODOPHTHALMUS, *Lamarck*,	...	...	xiii, 206, 207
vigil (*Fabricius*),	...	...	xxxi, xxxvii, xlvii, 207
PODOPISA, Hilgendorf,	...	...	x, 61
petersii, Hilgendorf,	...	...	61
POLYBIENS, A. Milne Edwards,	...	...	170
POLYBIUS, *Leach*,	...	...	170
PONTUS, de Haan,	...	...	169, 171, 172
convexus,	...	...	172
PORTUMNUS, *Leach*,	...	...	170, 201
PORTUNIDÆ,	...	...	xiii, xlvi, 169
PORTUNIENS, Milne Edwards,	...	...	xiii, 169
PORTUNIENS ANORMAUX, A. Milne Edwards,	...	...	xiii, 206
PORTUNIENS NORMAUX, A. Milne Edwards,	...	...	xiii, 169
PORTUNINÆ,	...	...	xiii, 169
PORTUNUS, *Fabricius*,	...	...	xiii, 170, 192, 199
arcuatus, de Haan,	...	...	195
carcinoides, Kinahan,	...	...	200
catharus, White,	...	...	202
corrugatus (*Pennant*),	...	...	xviii, xxi, xxii, xxxvii, xxxix, xlvii, 200, 201

PORTUNUS—*continued.*	Plate	Figure	Page
crucifer, Fabricius,	...	...	191
dalyelii, Spence Bate,	...	...	200
gladiator, Fabricius,	...	...	177
gladiator, de Haan,	...	...	180
guadulpensis, *de Saussure*,	...	...	200
hastatoides, Fabricius,	...	...	175
longipes, *Risso*,	...	...	200
ponticus, *Fabricius*,	...	...	175
prymna (var. *β*), de Haan,	...	...	197
pusillus, *Leach*,	...	...	200
sanguinolentus, de Haan,	...	...	174
serratus, de Haan,	...	...	185
strigilis, Stimpson,	...	...	200, 201
subcorrugatus, A. Milne Edwards,	...	...	200, 201
truncatus, de Haan,	...	...	191
variegatus, *Fabricius*,	...	...	190, 191
vigil, Fabricius,	...	...	207
POSIDON, Herklots,	...	...	169, 171
POTAMONAUTES, *MacLeay*,	...	...	xiii, 214
perlata, Milne Edwards,	...	...	xxi, xli, xlvii, 215
PRIONOPLAX, *Milne Edwards*,	...	...	149, 222, 237
PSAUMIS, Kossmann,	...	...	118, 119
PSEUDOCARCINUS, *A. Milne Edwards*,	...	...	141
gigas (*Lamarck*),	...	...	141
PSEUDOGRAPSUS, *Milne Edwards*,	...	...	xiv, 257, 261, 262, 263, 264, 265
albus, *Stimpson*,	...	...	xxiv, xxxvii, xlviii, 262
PSEUDOMICIPPA, *Heller*,	...	...	xi, 68
(?) varians, *Miers*,	...	...	xxv, xxxvi, xliv, 68
PSEUDOMICIPPE nodosa, *Heller*,	...	...	68
tenuipes, *A. Milne Edwards*,	...	...	68
PSEUDOPHILYRA, *Miers*,	...	...	303
PSEUDORHOMBILA, *Milne Edwards*,	...	...	222, 223, 224, 227, 237
normanni, Miers,	...	...	227, 228
vestita, var. *sexdentata*, Miers,	...	...	229
PSEUDOZIUS, *Dana*,	...	...	xii, 109, 141, 142, 143
bouvieri, *A. Milne Edwards*,	...	...	142
bouvieri, var. mellissii, *Miers*,	XII.	3	xix, xxxvi, xlv, 143
caystrus (*Adams and White*),	...	...	142
inornatus, *Dana*,	...	...	142
mellissii, Miers,	...	...	142, 143
microphthalmus, *Stimpson*,	...	...	142
planus, Dana,	...	...	142
sinensis, *A. Milne Edwards*,	...	...	142
PTYCHOGNATHUS, *Stimpson*,	...	...	262, 263
PUGETTIA, *Dana*,	...	...	x, 39, 40
australis,	...	...	40
gracilis, *Dana*,	...	...	40

PUGETTIA—*continued.*	Plate	Figure	Page
incisa (*de Haan*),	...	...	xxx, xxxvi; xliii, 40
lordi, Spence Bate,	...	...	40
nodulosa, *Dana*,	...	...	40
quadridens (*de Haan*),	...	...	40, 41
richii, *Dana*,	...	...	40
scutiformis, *Dana*,	...	...	40
velutina, *n. sp.*,	VI.	2	xxvi, xl, xliii; 40, 41
QUADRELLA, *Dana*,	...	...	163
coronata, *Dana*,	...	...	163
QUADRILATERA, Latreille,	...	...	216
RANDALLIA, *Stimpson*,	...	...	xvi, 303, **316**
granulata, *n. sp.*,	XXVI.	1	xxiv, xl, l, **317**
ornata (*Randall*),	...	...	317
RHABDONOTUS, *A. Milne Edwards*,	...	...	104
RHACONOTUS, *Gerstæcker*,	...	...	237
RHINOLAMBRUS, *A. Milne Edwards*,	...	...	xi, 92, 99
RHIZOPA, *Stimpson*,	...	...	223, 234
gracilipes, *Stimpson*,	...	...	235
RHIZOPINÆ,	...	...	223, 233
RHODIA, Bell,	...	...	x
RHYNCHOPLAX, *Stimpson*,	...	...	275
ROCHINIA, *A. Milne Edwards*,	...	...	64
gracilipes, *A. Milne Edwards*,	...	...	64
SCALOPIDIA, *Stimpson*,	...	...	223, 234
SCHIZOPHRYS, *White*,	...	...	xi, xii, 66
aspera (*Milne Edwards*),	...	...	xxv, xxxvi; xliv, 66, **67**
dama (*Herbst*),	...	...	67
dichotoma, *Milne Edwards*,	...	...	66
serratus, White,	...	...	67
spinifer, White,	...	...	67
triangularis, Kossmann,	...	...	67
triangularis, var. *africana*, Kossmann,	...	...	67
triangularis, var. *indicus*, Kossmann,	...	...	67
SCHIZOPHRYSINÆ,	...	...	xi, 66
SCOPIMERA, *de Haan*,	...	...	ix, 274, 275
SCYLLA, *de Haan*,	...	...	xiii, 169, **184**
serrata (*Forskal*),	...	...	xxxi, xxxvii; xlvi, **185**
SCYRA, *Dana*,	...	...	x, 43, 62
acutifrons, *Dana*,	...	...	62
compressipes, *Stimpson*,	VII.	4	xxx, xxxix; xliv, 62, **63**
umbonata, *Stimpson*,	...	...	62
SCYRAMATHIA, *A. Milne Edwards*,	...	...	12
SESARMA, *Say*,	...	...	xiv, 267, **269**
angustipes, *Dana*,	...	...	270
aubryi, *A. Milne Edwards*,	...	...	xxv, xxvii; xxx, xxxviii; xlviii, 271
büttikoferi, *de Man*,	...	...	270
granosimana, *Miers*,	...	...	270
kamermani, *de Man*,	...	...	270
longipes, Krauss,	...	...	268

SESARMA—*continued.*	Plate	Figure	Page
miniata, *de Saussure*,	...	...	270
mülleri, *A. Milne Edwards*,	XXI.	3	xx, xxxviii; xlviii, **270**
pentagona, *Hutton*,	...	...	270
schüttei, *Hess*,	...	...	xxii, xxxviii; xlviii, **271**
stimpsonii, *Miers*,	...	...	270
SESARMINÆ,	...	...	253
SESARMINI,	...	...	253
SIMOCARCINUS, *Miers*,	...	...	35
simplex, *Dana*,	...	...	35
SISYPHUS, *A. Milne Edwards*,	...	...	43
SISYPHUS, *Desbonne and Schramm*,	...	...	71
SOLENOLAMBRUS, *Stimpson*,	...	...	91, 92
SPELÆOPHORUS, *A. Milne Edwards*,	...	...	297, 318
SPEOCARCINUS, *Stimpson*,	...	...	222
SPHÆROZIUS, *Stimpson*,	...	...	xii, 109, 144
dispar (*Dana*),	...	...	144
nitidus, *Stimpson*,	XII.	4	xxx, xxxix; xlv, **144**
SPHENOCARCINUS, *A. Milne Edwards*,	...	...	34
STENORHYNCHUS, *Lamarck*,	...	...	x, **5**, 8, 10, 11
ægyptius, *Milne Edwards*,	...	...	6
brevirostris, *Haswell*,	...	...	6, 18
curvirostris, *A. Milne Edwards*,	...	...	6, 18
czernjawskii, *Brandt*,	...	...	6
falcifer, *Stimpson*,	I.	1	xxi, xxxv; xliii, **6**
fissifrons, *Haswell*,	...	...	6, 18
inermis, Heller,	...	...	6
longirostris (*Fabricius*),	...	...	5, 6
rostratus (*Linné*),	...	...	6
rostratus, var. spinulosus, *Miers*,	...	...	6
spinifer, *n. sp.*,	I.	2	xxi, xxxv; xxxviii; xliii, **6**, **7**
TELEOPHRYS, *Stimpson*,	...	...	xi, 87
TETRALIA, *Dana*,	...	...	163
THALAMITA, *Latreille*,	...	...	xiii, 170, 190; 192, 193, 194; 195, 197
admete (*Herbst*),	...	...	xxiv, xxxvii; xlvii, **194**; 195, 196
arcuatus, de Haan,	...	...	195
cœrullipes, *Jacquinot and Lucas*,	...	...	194, 199
crenata, *Rüppell*,	...	...	xxv, xxxvii; xlvii, 194; **199**
danæ, *Stimpson*,	...	...	193, 194, 199
gracilipes, *A. Milne Edwards*,	...	...	192, 193
hellerii, *Hoffmann*,	...	...	194
integra, *Dana*,	...	...	xxxi, xxxvii; xlvii, **195**
integra, var. africana, *Miers*,	...	...	194

THALAMITA—*continued.*	Plate	Figure	Page
intermedia, *n. sp.*,	XVI.	1	xxv, xxxvii, xlvii, 194, 196, 197
picta, *Stimpson*,	...	...	194
prymna, Milne Edwards,	...	...	xxiv, xxvii, xxviii, xxxvii, xlvii, 194, 197, 198
pyrmna (var. β), de Haan,	...	...	197
quadrilobata, *Miers*,	...	...	194
savignyi, *A. Milne Edwards*,	...	...	194, 196
sexlobata, *n. sp.*,	XVI.	2	xxiii, xxxvii, xlvii, 194, 196
sima, *Milne Edwards*,	...	...	xxii, xxiii, xxv, xxxvii, xlvii, 195
speciosa, *Miers*,	...	...	194
spinimana, *Dana*,	...	...	194
stimpsoni, *A. Milne Edwards*,	...	...	xxiii, xxviii, xxxvii, xlvii, 194, 198
truncatus (de Haan),	...	...	191
THALAMITES quadrilatères, Milne Edwards,	...	...	193
THALAMITIENS, A. Milne Edwards,	...	...	170
THALAMITINÆ,	...	...	170, 193
THALAMITOIDES, *A. Milne Edwards*,	...	...	170, 195
THALAMONYX, *A. Milne Edwards*,	...	...	xiii, 170, 192, 206
danæ, A. Milne Edwards,	...	...	192
danæ, var. gracilipes, *A. Milne Edwards*,	...	...	xxiii, xxxvii, xlvii, 192
THAUMASTOPLAX, *Miers*,	...	...	275
THEALIA, Lucas,	...	...	xv, 288, 290
acanthopora, *Lucas*,	...	...	291
THELPHUSA, *Latreille*,	...	...	xiii, 213
africana, *A. Milne Edwards*,	...	...	215
berardii, de Haan,	...	...	215
borneensis, *von Martens*,	...	...	214
chilensis, *Heller*,	...	...	213
crassa, *A. Milne Edwards*,	...	...	214
cumingii, *Miers*,	...	...	214
dehaanii, *White*,	...	...	xxx, xxxi, xli, xlvii, 215
depressa, var. johnstoni, *Miers*,	...	...	214
dubia, *Capello*,	...	...	214
fluviatilis, *Latreille*,	...	...	213
kuhlii, *de Man*,	...	...	214
leichardtii, *Miers*,	...	...	214
limula, *Bilgendorf*,	...	...	214
longipes, *A. Milne Edwards*,	...	...	214
madagascariensis, *A. Milne Edwards*,	...	...	214
nilotica, *Milne Edwards*,	...	...	214
pealiana, *Wood-Mason*,	...	...	214
perlata, *Milne Edwards*,	...	...	xxi, xli, xlvii 215

THELPHUSA—*continued.*	Plate	Figure	Page
sinuatifrons, *Milne Edwards*,	XVIII.	1	xxix, xli, xlvii 214
sumatrensis, *Miers*,	...	...	214
THELPHUSIENS, *Milne Edwards*,	...	...	xiii, 212
THELPHUSINÆ, Milne Edwards,	...	...	212
THELPHUSINEA,	...	...	xiii, xlvii, 212
THIA,	...	...	vii
THRANITES, *Bovallius*,	...	...	170, 186
TLOS, *Adams and White*,	...	...	297
TRACHYMAIA, *A. Milne Edwards*,	...	...	12
cornuta, *A. Milne Edwards*,	...	...	31
TRAPEZIA, *Latreille*,	...	...	viii, xii, 107 163, 232, 253
acutifrons, *A. Milne Edwards*,	...	...	165
areolata, *Dana*,	...	...	166
areolata, *var.* inermis, *A. Milne Edwards*,	...	...	xxiv, xxxvii xlvi, 166, 167
areolata, var. *lævis*,	...	...	166
bella, *Dana*,	...	...	164
cymodoce (*Herbst*),	...	...	xxiii, xxviii xxxvii, xlvi 165, 166
cærulea, *Rüppell*,	...	...	165
corallina, *Gerstæcker*,	...	...	165
dentata, *MacLeay*,	...	...	165
dentifrons, Latreille,	...	...	165
digitalis, *Latreille*,	...	...	164
ferruginea, Latreille,	...	...	165, 166
flavo-punctata, *Eydoux and Souleyet*,	...	...	166, 167
formosa, *Smith*,	...	...	164
fusca, *Jacquinot and Lucas*,	...	...	165
guttata, *Rüppell*,	...	...	165, 166, 168
guttata, *Rüppell*, var.,	XII.	1	xxiv, xxxvii xlvi, 166
hirtipes, *Jacquinot and Lucas*,	...	...	165, 166
latifrons, A. Milne Edwards,	...	...	166
leucodactyla, Rüppell,	...	...	164
miniata, Jacquinot and Lucas,	...	...	165
nigrofusca, *Stimpson*,	...	...	165
reticulata, Stimpson,	...	...	166
rufopunctata (*Herbst*),	...	...	xxviii, xlvi 165, 167, 168
rufopunctata (*Herbst*), var. intermedia, *nov.*,	XII.	2	xxxi, xxxvii xlvi, 168
speciosa, *Dana*,	...	...	164
subdentata, Gerstæcker,	...	...	165
tigrina, Eydoux and Souleyet,	...	...	165
TRAPEZIDES, *A. Milne Edwards*,	...	...	xii, 163
TRAPEZIINÆ,	...	...	xii, 163
TRICHOCARCINUS, *Miers*,	...	...	110, 210
TRICHOCERA, de Haan,	...	...	210
TRICHOPUS, de Haan,	...	...	265
TRIGONOPLAX, *Milne Edwards*,	...	...	275
TUBICOLA, Lockington,	...	...	274
TYMOLUS, *Stimpson*,	...	...	326
TYPHLOCARCINUS, *Stimpson*,	...	...	223, 233, 234
UCA, *Leach*,	...	...	217
UHLIAS, *Stimpson*,	...	...	297

	Plate	Figure	Page
VARUNA, *Milne Edwards*,	...	...	xiv, 262, 265
litterata (*Fabricius*),	...	...	xxvii, xxix, xxxviii, xli, xlviii, 265
XANTHASIA, *White*,	...	...	274
XANTHO, *Leach*,	...	...	xii, 107, 108, 116, 119, 124, 127, 128, 129, 137
affinis, de Haan,	...	...	137
arcuatus, *Heller*,	...	...	125
bidentatus, *A. Milne Edwards*,	xi.	4	xxviii, xxxvi, xlv, 125, 126
bouvieri, A. Milne Edwards,	...	...	143
crenatus, *Milne Edwards*,	...	...	125
cultrimanus, White,	...	...	127
denticulatus, *White*,	...	...	125
dispar, *Dana*,	...	...	125
distinguendus, de Haan,	...	...	137
floridus (*Montgomery*),	...	...	124
granosimanus, *A. Milne Edwards*,	...	...	125
granulosus, Rüppell,	...	...	114
hirtipes, *Milne Edwards*,	...	...	125
impressus (*Lamarck*),	...	...	125
lævidorsalis,	...	...	127
macgillivrayi, *Miers*,	...	...	125
maculatus (*Haswell*),	...	...	125
minor, *Dana*,	...	...	124
multidentatus, Lockington,	...	...	125
nudipes, *A. Milne Edwards*,	...	...	125
occidentalis, *A. Milne Edwards*,	...	...	125
peuce, White,	...	...	139
peronii, Milne Edwards,	...	...	122
pilipes, *A. Milne Edwards*,	...	...	124
punctatus, *Milne Edwards*,	...	...	125, 127
quinque-dentatus, Krauss,	...	...	137
rivulosus, *Risso*,	...	...	124
spinosus, *Hess*,	...	...	119, 122
stimpsonii, *Smith*,	...	...	125
truncatus, *de Haan*,	...	...	125
tuberculatus, *Bell*,	...	...	124
XANTHODES, *Dana*,	...	...	xii, 108, 124, 127
angustus, *Lockington*,	...	...	128
atromanus, *Haswell*,	...	...	127
XANTHODES—*continued.*	Plate	Figure	Page
bidentatus, *A. Milne Edwards*,	...	...	128
depressus, *White*,	...	...	127
elegans, *Stimpson*,	...	...	127
eriphioides, *A. Milne Edwards*,	...	...	128
granosomanus, Dana,	...	...	127
hemphilliana, *Lockington*,	...	...	116
hemphilli, Lockington,	...	...	115, 116
insculpta, *Stimpson*,	...	...	128
lamarckii (*Milne Edwards*),	...	...	127
leucomanus, Lockington,	...	...	115, 116
melanodactylus, *A. Milne Edwards*,	...	...	xviii, xxxvi, xxxix, xlv, 128
nitidulus, *Dana*,	...	...	127
notatus, *Dana*,	...	...	127
pachydactylus, *A. Milne Edwards*,	...	...	127
rufopunctatus, *A. Milne Edwards*,	...	...	128
scabra (*Fabricius*),	...	...	127
spinituberculatus (Lockington),	...	...	128
taylori, *Stimpson*,	...	...	128
xantusii, *Stimpson*,	...	...	128
XANTHODIUS, Stimpson,	...	...	136
XAIVA, MacLeay,	...	...	170
XENOPHTHALMODES, *Richters*,	...	...	223
XENOPHTHALMUS, *White*,	...	...	275
XIPHONECTES, *A. Milne Edwards*,	...	...	xiii, 169, 183, 184
leptocheles, A. Milne Edwards,	...	...	183, 184, 185
longispinosus (*Dana*),	...	...	xxiii, xxxvii, xlvi, 183
vigilans, *Dana*,	...	...	183
ZOZYMUS, *Leach*,	...	...	xii, 108, 119, 134
æneus (*Linné*),	...	...	xxiv, xxxvi, xlv, 134
gemmula, *Dana*,	...	...	134
lævis, *Dana*,	...	...	134
pilosus, *A. Milne Edwards*,	...	...	134
pumilus, *Jacquinot and Lucas*,	...	...	134
tomentosus, Milne Edwards,	...	...	135

PLATE I.

PLATE I.

		Diam.	Page
Fig. 1.	*Stenorhynchus falcifer*, Stimpson, adult male, . . .	× 2	6
	Fig. 1*a*. Lateral view (in outline) of the carapace, . . .	× 3	
	Fig. 1*b*. Exterior view of a chelipede, ...	× 3	
Fig. 2.	*Stenorhynchus spinifer*, n. sp. ; dorsal view of part of the carapace and rostrum ; considerably magnified, . . .		7
	Fig. 2*a*. Inferior view of part of the carapace and rostrum of *Stenorhynchus spinifer;* considerably magnified.		
Fig. 3.	*Achæus tenuicollis*, n. sp., adult male, ...	× 3	9
	Fig. 3*a*. Lateral view of carapace (in outline), ...	× 4½	
	Fig. 3*b*. Inferior view of the rostrum and antennal region of the same species,	× 7	
	Fig. 3*c*. Chelipede of the same species, ...	× 4	
Fig. 4.	*Achæopsis spinulosus*, Stimpson, adult female, . . .	× 3	18
	Fig. 4*a*. Inferior view of the cervical region of the same species, .	× 5	

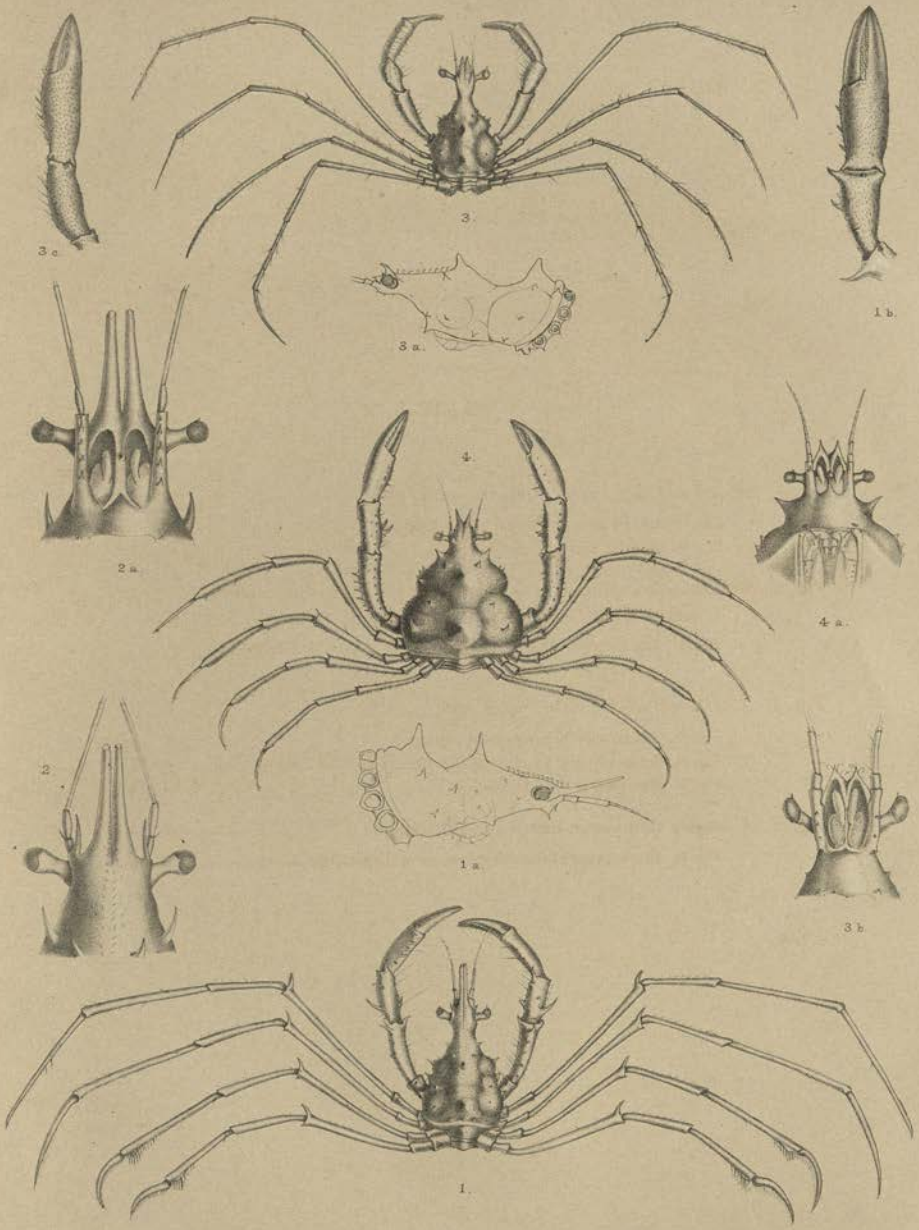

3 c
3.
3 a.
1 b.
2 a.
4.
4 a.
2.
1 a.
3 b.
1.

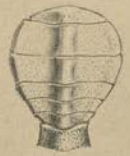
PLATE II.

PLATE II.

	Diam.	Page
Fig. 1. *Platymaia wyville-thomsoni*, n. gen. and sp., adult female, .	nat. size.	13
Fig. 1*a*. Lateral view (in outline) of the carapace of the same species, .	nat. size.	
Fig. 1*b*. Inferior view of the cervical region, showing the structure of the orbits, antennæ, and maxillipedes, . . .	× 2	
Fig. 1*c*. Chelipede of the female, ...	× $1\frac{1}{2}$	
Fig. 1*d*. Magnified view of the bases of the first and second ambulatory legs, showing the spines on the coxæ and following joints, and also the intervening sternal spines, . . .	× 2	
Fig. 1*e*. Post-abdomen of the female, ...	nat. size.	

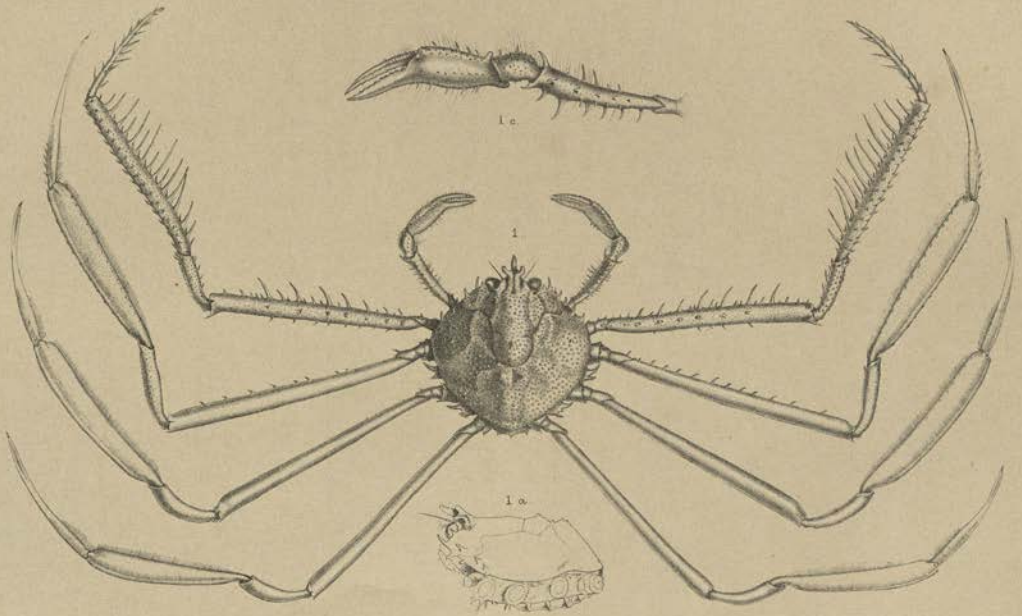
1 d

1 b



1 e

1 c



1

1 a

Robt Morgan del. et lith.

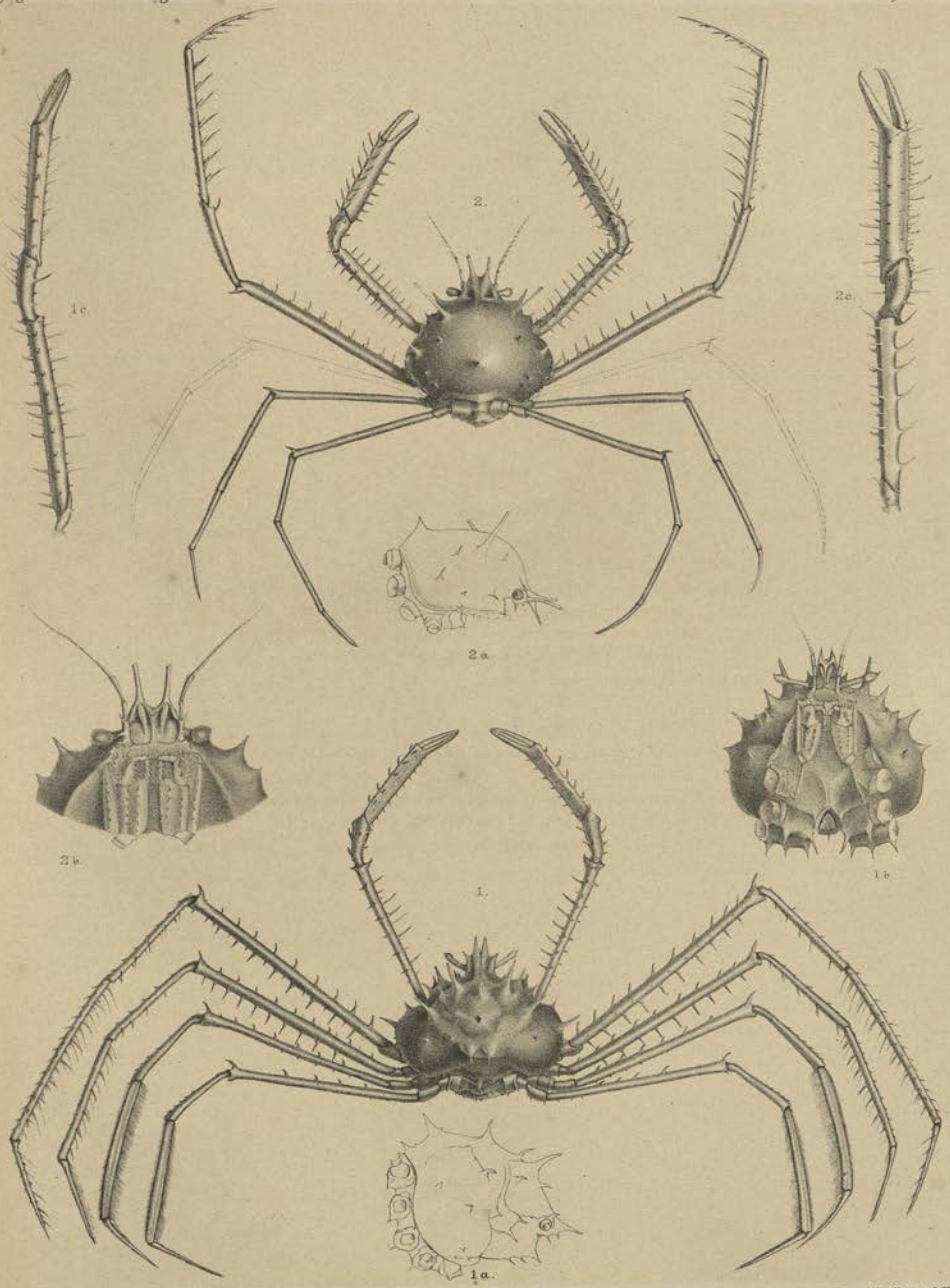
West, Newman & C.o imp.

PLATYMAIA WYVILLE-THOMSONI n. gen. & sp.

PLATE III.

PLATE III.

		Diam.	Page
Fig. 1.	*Cyrtomaia murrayi*, n. gen. and sp., adult male, . .	× 1½	15
	Fig. 1*a*. Lateral view of the carapace of the same specimen in outline, showing the elevation and convexity of its dorsal surface, .	× 1½	
	Fig. 1*b*. Inferior view of part of the body, showing the form, position, and structure of the orbits, antennæ, and maxillipedes, . .	× 2	
	Fig. 1*c*. Chelipede of the same specimen, ...	× 2	
Fig. 2.	*Cyrtomaia suhmi*, n. sp., adult male, ...	nat. size.	16
	Fig. 2*a*. Lateral view of the carapace in outline, showing the convexity of its dorsal surface, ...	nat. size.	
	Fig. 2*b*. Inferior view of the cervical region, showing the form and position of the eyes, antennæ, and maxillipedes, . . .	× 2	
	Fig. 2*c*, Chelipede of the same specimen, ...	× 1½	



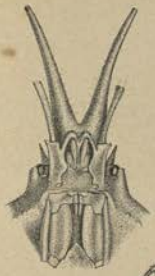
Robt Morgan del. et lith. West, Newman & Co. imp.

CYRTOMAIA.

PLATE IV.

PLATE IV.

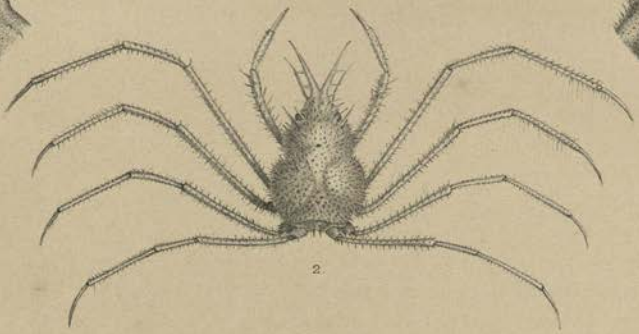
		Diam.	Page
Fig. 1. *Anamathia pulchra*, n. sp., adult male, . . .	×	1½	26
Fig. 1*a*. Lateral view of the carapace of the same species, . .	×	1½	
Fig. 1*b*. Inferior view of the cervical region, showing the structure of the orbits, antennæ, and outer maxillipedes, . . .	×	2	
Fig. 1*c*. Post-abdomen of the male.			
Fig. 2. *Echinoplax mosleyi*, n. gen. and sp., adult female, . .	×	1½	32
Fig. 2*a*. Lateral view of the carapace in outline, ...	×	1½	
Fig. 2*b*. Inferior view of the cervical region, showing the orbits, antennæ, and outer maxillipedes, ...	×	3	
Fig. 2*c*. Post-abdomen of the female.			
Fig. 3. *Eurypodius latreillei*, Guérin-Ménéville; exterior view of a chelipede, adult male, typical form, . . .	nat. size.		22
Fig. 3*a*. Chelipede of a variety of the same species (adult male), showing the difference in the form of the palm and tuberculation of the fingers, ...	nat. size.		



1 b.

2 a.

2 b.

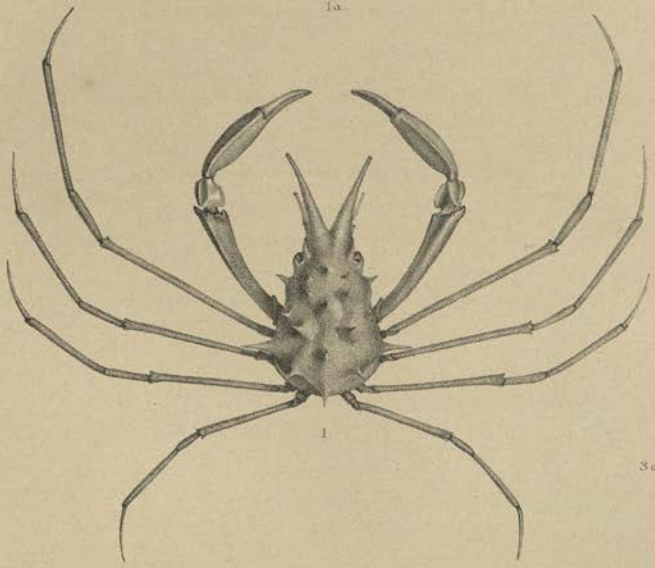


2.

2 c.

1 a.

1 c.



1.

3.

3 a.

PLATE V.

PLATE V.

		Diam.	Page
Fig. 1. *Eurypodius longirostris*, n. sp.; carapace of male example,	×	1½	23
Fig. 1*a*. Lateral view of carapace of the same specimen,	×	1½	
Fig. 2. *Lispognathus thomsoni* (Norman), var.?; carapace of male example from Sydney, New South Wales,	×	3	28
Fig. 2*a*. Lateral view of carapace in outline,	×	4	
Fig. 2*b*. Inferior view of the cervical region, showing the structure of the eyes, antennæ, and maxillipedes,	×	5	
Fig. 2*c*. Chelipede of the same specimen,	×	4	
Fig. 3. *Ergasticus naresii*, n. sp., adult female,	×	4	30
Fig. 3*a*. Lateral view of the carapace in outline	×	4	
Fig. 3*b*. Inferior view of the cervical region, showing the structure of the eyes, orbits, antennæ, and maxillipedes,	×	7	
Fig. 3*c*. Chelipede of the female,	×	6	

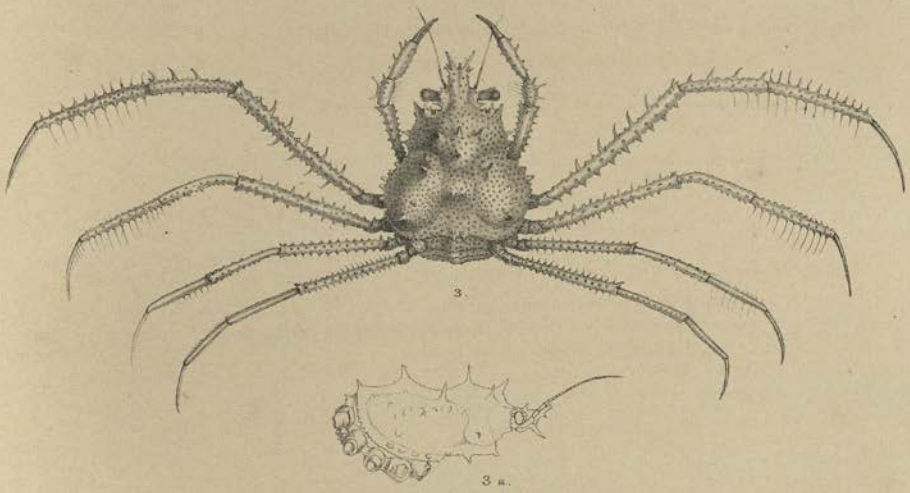
2 a.

2.

1 a.

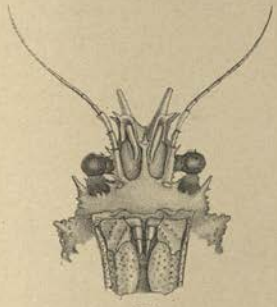
3 c.

2 c.

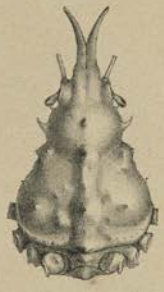


3.

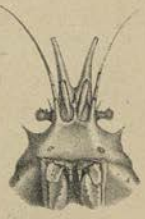
3 a.



3 b.



1



2 b.

Robt Morgan del. et lith.

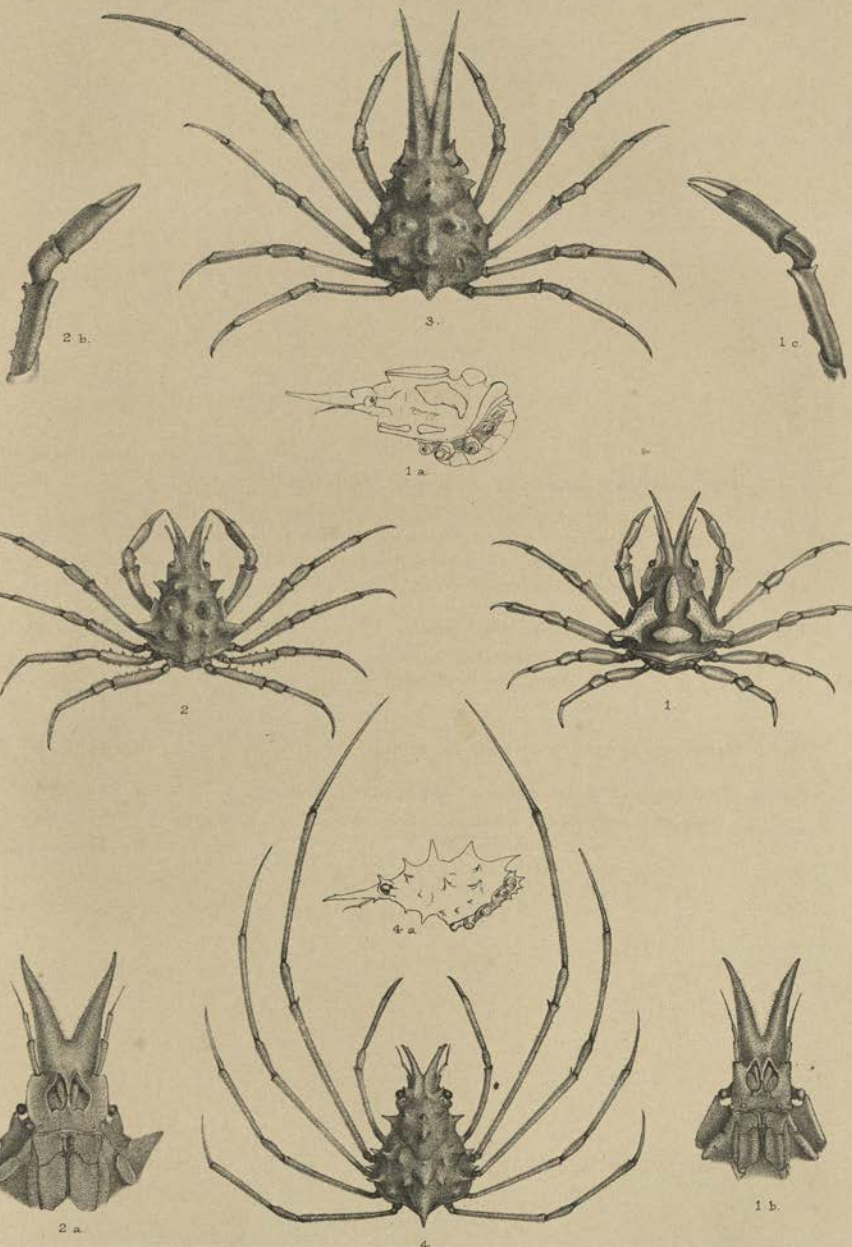
EURYPODIUS — LISPOGNATHUS — ERGASTICUS.

West, Newman & Co imp.

PLATE VI.

PLATE VI.

		Diam.	Page
Fig. 1. *Oxypleurodon stimpsoni*, n. gen. and sp., adult female, . .	×	2	38
Fig. 1*a*. Lateral view of the carapace of the same specimen, . .	×	3	
Fig. 1*b*. Inferior view of the cervical region, showing the position and structure of the eyes, antennæ, and exterior maxillipedes, .	×	4	
Fig. 1*c*. Chelipede of the same specimen, ...	×	4	
Fig. 2. *Pugettia velutina*, n. sp., adult female, ...	×	1½	41
Fig. 2*a*. Inferior view of the cervical region, showing the form of the orbits, antennæ, and maxillipedes, . . .	×	4	
Fig. 2*b*. Chelipede of the same specimen, ...	×	3	
Fig. 3. *Hyastenus elegans*, n. sp., female example, . . .	×	1½	58
Fig. 4. *Naxia hystrix*, n. sp., female example, nearly adult, . .	×	1½	60
Fig. 4*a*. Lateral view of the carapace of the same specimen, showing the elevation of the dorsal spines, ...	×	1½	



Robt Morgan del. et lith.

OXYPLEURODON — PUGETTIA — HYASTENUS - NAXIA.

West, Newman & Co imp.

PLATE VII.

PLATE VII.

		Diam.	Page
Fig. 1.	*Herbstia rubra*, A. Milne Edwards, male example, . . .	× 2½	49
	Fig. 1*a*. Chelipede of the male, ...	× 5	
Fig. 2.	*Herbstia* (*Herbstiella*) *depressa*, Stimpson, . . .	× 2½	51
Fig. 3.	*Chlorinoides coppingeri* (Haswell), adult male, . . .	× 2½	53
	Fig. 3*a*. Inferior view of the cervical region, showing the form of the basal antennal joint and exterior maxillipedes, . . .	× 3	
	Fig. 3*b*. Chelipede, ...	× 4	
Fig. 4.	*Scyra compressipes*, Stimpson, adult male, . . .	× 2½	63
	Fig. 4*a*. Lateral view of rostrum and orbit, ...	× 3	
	Fig. 4*b*. Inferior view of the cervical region, showing the form of the antennæ and exterior maxillipedes, . . .	× 3	
	Fig. 4*c*. Chelipede, ...	× 2½	

4 b.

3.

3 a.

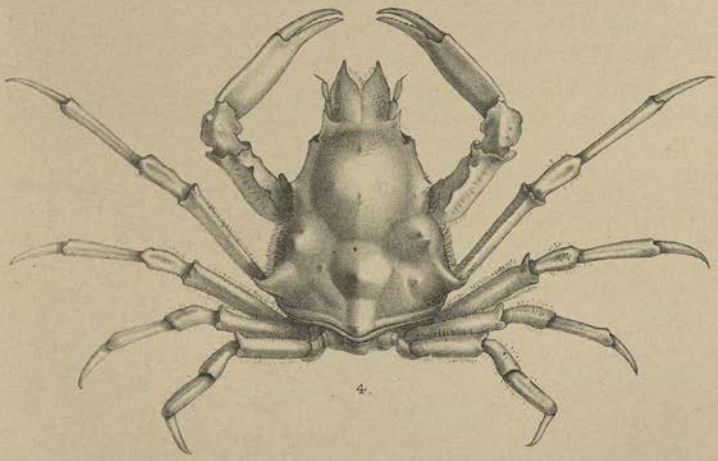
1 a.

2.

1.

4 a.

4 c.



4.

3 b.

PLATE VIII

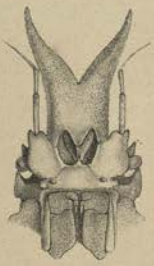
PLATE VIII.

		Diam.	Page
Fig. 1. *Notolopas brasiliensis*, n. sp., male example,	×	3	64
Fig. 1*a*. Post-abdomen of the male,	×	8	
Fig. 1*b*. Inferior view of the cervical region of a variety with more strongly divergent rostral spines, showing also the form of the basal antennal joint and exterior maxillipedes in this species (from an adult male),	×	5½	
Fig. 1*c*. *Notolopas lamellatus*, Stimpson (?), adult male; inferior view of the cervical region, showing the form of the basal antennal joint and exterior maxillipedes (figured for comparison from a specimen in the collection of the British Museum),	×	5	
Fig. 2. *Micippa spinosa*, Stimpson, adult male,	×	2	70
Fig. 2*a*. Rostrum of the same species; anterior view,	×	2½	
Fig. 2*b*. Chelipede,	×	3½	
Fig. 3. *Micippa spinosa*, var. *affinis*, Miers, adult male,	×	2	70
Fig. 3*a*. Rostrum; anterior view,	×	3	
Fig. 3*b*. Chelipede,	×	5	
Fig. 3*c*. Post-abdomen of the male	×	5	

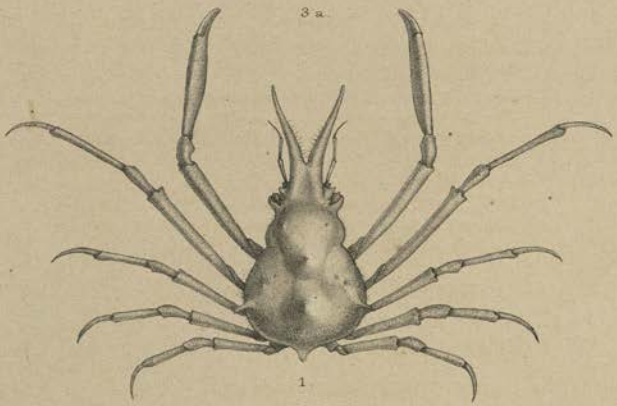
1 b.

3

3 a.



1 c.

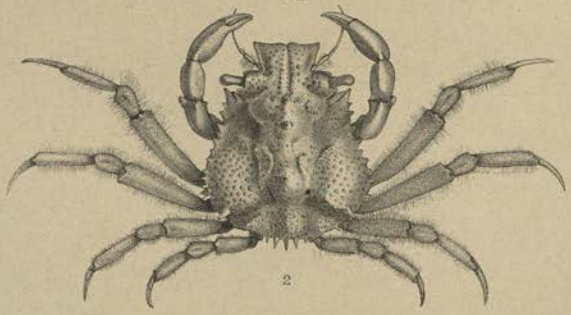


1

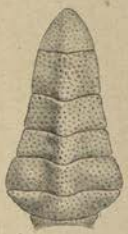
3 b

2 b.

2 a.



2



1 a.

3 c.

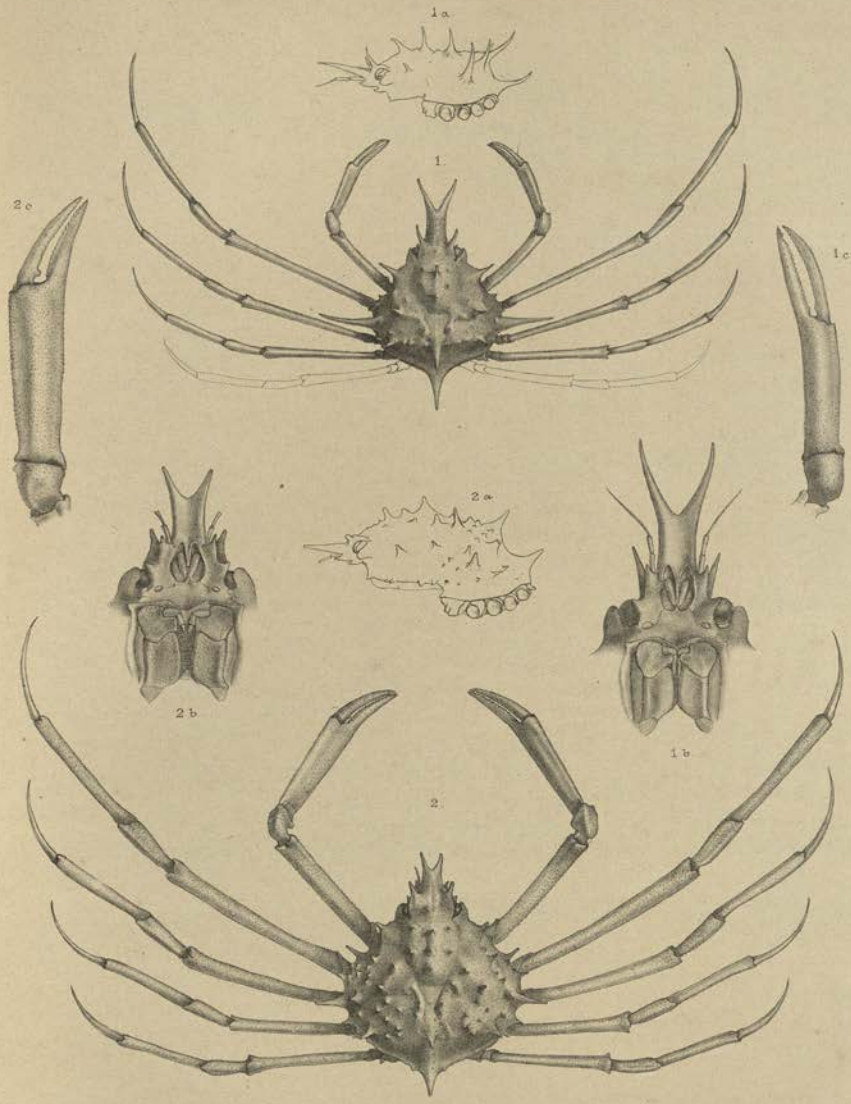
Robt Morgan del. et lith. West, Newman & Co imp.

NOTOLOPAS — MICIPPA.

PLATE IX.

PLATE IX.

	Diam.	Page
Fig. 1. *Libinia smithii*, n. sp., adult male, . . .	nat. size.	73
Fig. 1*a*. Lateral view (in outline) of the carapace of the same species, showing the spines of the dorsal surface, &c., . . .	nat. size.	
Fig. 1*b*. Inferior view of the cervical region, showing the orbits, antennæ, and the exterior maxillipedes, ...	× 2	
Fig. 1*c*. Exterior view of a chelipede, ...	× 2	
Fig. 2. *Libinia gracilipes*, n. sp., ...	nat. size.	74
Fig. 2*a*. Lateral view (in outline) of the carapace, showing the spines and tubercles of the dorsal surface, ...	nat. size.	
Fig. 2*b*. Inferior view of the cervical region, showing the orbits, antennæ, and exterior maxillipedes, ...	× 2	
Fig. 2*c*. Exterior view of a chelipede, ...	× 1½	



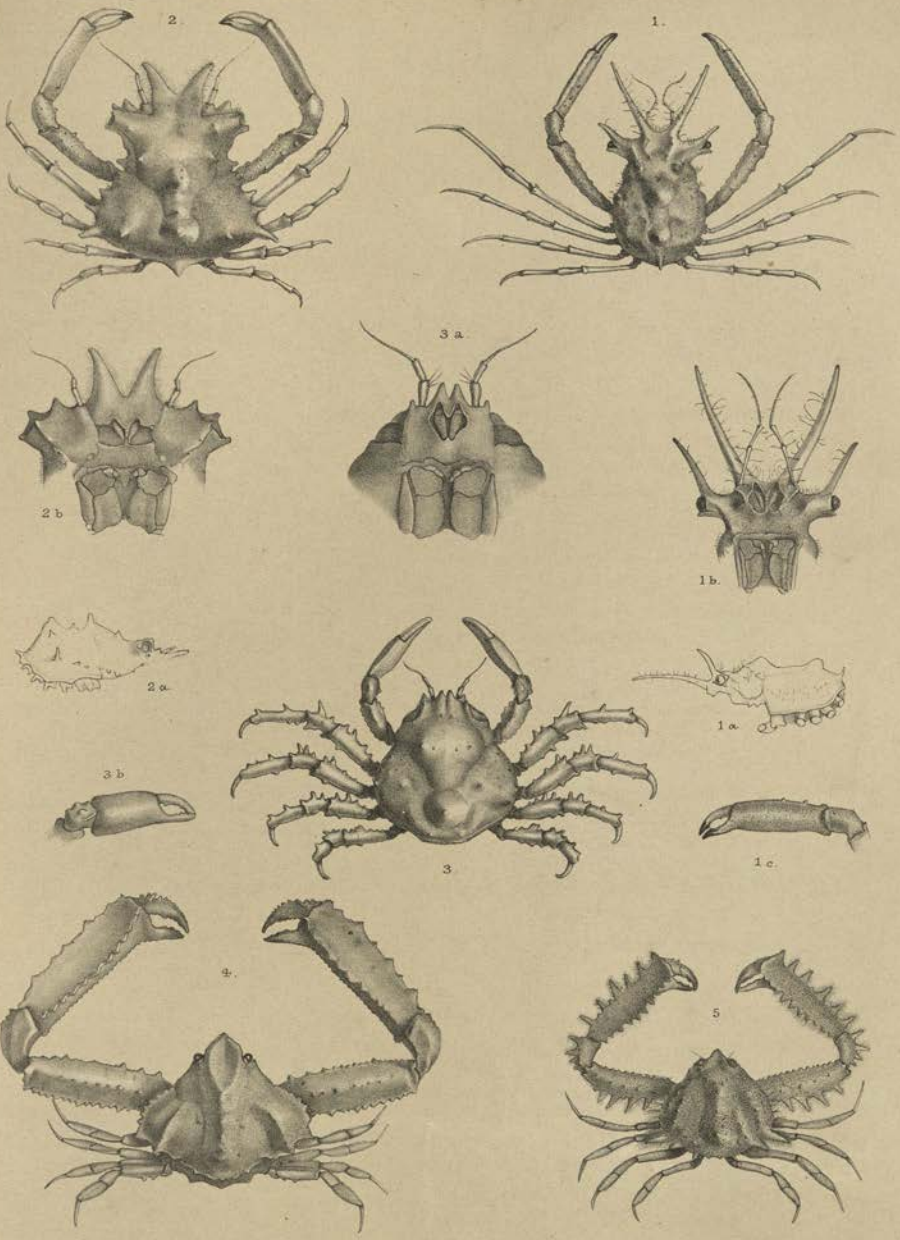
LIBINIA.

Robt Morgan del. et lith. West, Newman & Co. imp.

PLATE X.

PLATE I

		Diam.	Page
Fig. 1. *Picroceroides tubularis*, n. gen. and sp., adult male, .	×	1½	77
Fig. 1*a*. Lateral view (in outline) of the carapace, . .	×	1½	
Fig. 1*b*. Inferior view of the cervical region, showing the eyes, antennæ, and exterior maxillipedes, . . .	×	2½	
Fig. 1*c*. Chelipede, ...	×	2½	
Fig. 2. *Macrocœloma concava*, n. sp., adult male, . . .	×	1½	81
Fig. 2*a*. Lateral view of carapace in outline, . . .		nat. size.	
Fig. 2*b*. Inferior view of the cervical region, showing the form of the antennæ and exterior maxillipedes, . . .	×	2	
Fig. 3. *Mithrax* sp., young male example, ...	×	5	89
Fig. 3*a*. Inferior view of the cervical region, showing the basal antennal joint and maxillipedes; considerably magnified.			
Fig. 3*b*. Chelipede of the same specimen.			
Fig. 4. *Lambrus intermedius*, Miers, adult male (from the type-specimen, from the Korean Channel, in the collection of the British Museum), ...	×	about 2	96
Fig. 5. *Lambrus* (*Aulacolambrus*) *hoplonotus*, var. *granulosus*, Miers, adult female, ...	×	2	98



Robt Morgan. del. et lith.

PICROCEROIDES – MACROCŒLOMA – MITHRAX – LAMBRUS.

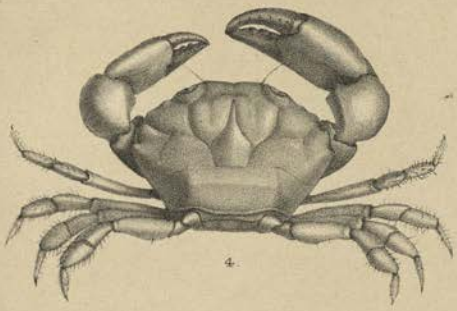
West, Newman & Co imp.

PLATE XI.

PLATE XI.

		Diam.	Page
Fig. 1. *Lophozozymus* (*Lophoxanthus*) *bellus*, var. *leucomanus*, Lockington, adult male,	×	nearly 3	115
Fig. 1*a*. Inferior view of the cervical region, showing the antennæ and the exterior maxillipedes,	×	4	
Fig. 1*b*. Chelipede,	×	3½	
Fig. 2. *Medœus haswelli*, n. sp.; carapace of an adult male,	×	about 5	117
Fig. 2*a*. Inferior view of the cervical region, showing part of the orbits, the antennæ, and the exterior maxillipedes,	×	about 5	
Fig. 2*b*. Chelipede,	×	about 4	
Fig. 2*c*. Post-abdomen of the male.			
Fig. 3. *Actæa hystrix*, n. sp., female,	×	4½	121
Fig. 3*a*. Inferior view of the cervical region, showing part of the orbits, the antennæ, and exterior maxillipedes,	×	about 6	
Fig. 3*b*. Chelipede,	×	5	
Fig. 4. *Xantho bidentatus*, A. Milne Edwards, adult male,	×	3	126
Fig. 4*a*. Inferior view of the cervical region, showing part of the orbits, the antennæ, and the exterior maxillipedes,	×	5	
Fig. 4*b*. Larger chelipede,	×	3	

1 b.



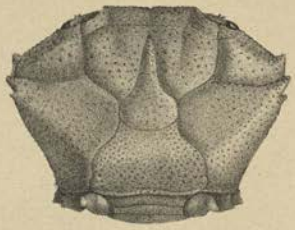
4.

4 b.

2 a.

2 b.

4 a.

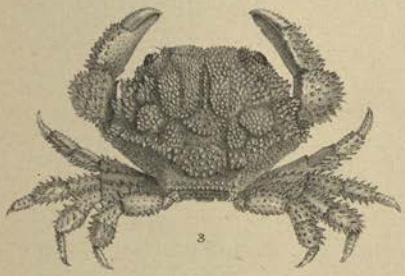


2.

3 a.

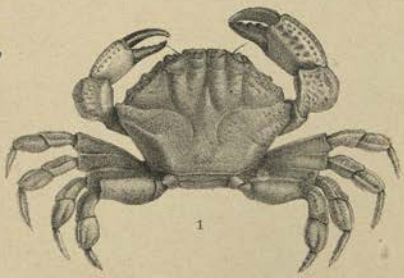
1 a.

3 b.



3.

2 c.



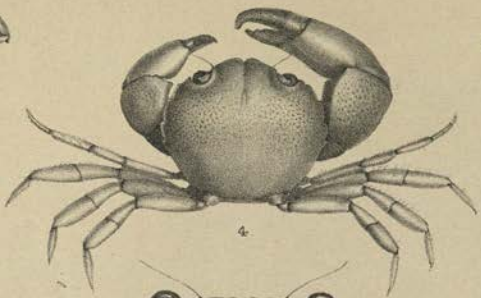
1.

PLATE XII.

PLATE XII.

			Diam.	Page
Fig. 1.	*Trapezia guttata*, Rüppell, var., adult female,	×	3½	166
	Fig. 1*a*. Chelipede,	×	about 3	
Fig. 2.	*Trapezia rufopunctata* (Herbst), var. *intermedia*, nov., adult female,	×	2	168
	Fig. 2*a*. Inferior view of the cervical region, showing the form of the antennæ, part of the orbits, and exterior maxillipedes,	×	2½	
	Fig. 2*b*. Chelipede,	×	1½	
Fig. 3.	*Pseudozius bouvieri*, var. *mellissii*, Miers, adult female,		nat. size.	143
	Fig. 3*a*. Inferior view of the cervical region, showing the form of the antennæ and exterior maxillipedes,	×	about 2	
	Fig. 3*b*. Exterior view of a chelipede,		nat. size.	
	Fig. 3*c*. Post-abdomen,	×	1½	
Fig. 4.	*Sphærozius nitidus*, Stimpson, adult male,	×	about 5	144
	Fig. 4*a*. Inferior view of the cervical region, showing the form of the antennæ and exterior maxillipedes,	×	6	
	Fig. 4*b*. Exterior view of a chelipede,	×	4½	
	Fig. 4*c*. Post-abdomen,	×	8	

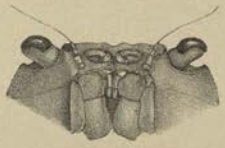
1 a.



4

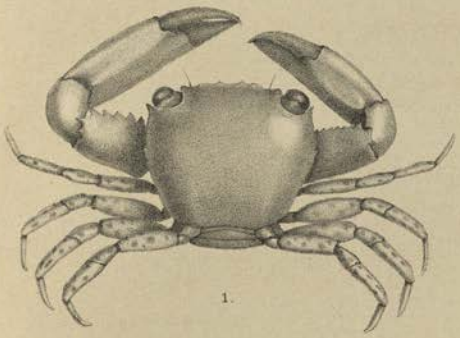
4 b.

3 c.

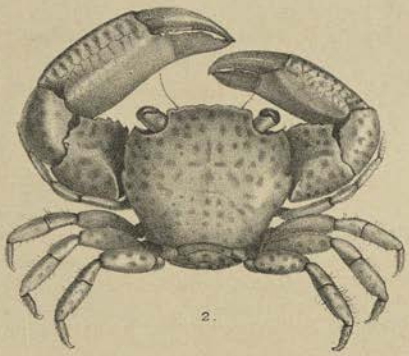


2 a.

4 c.

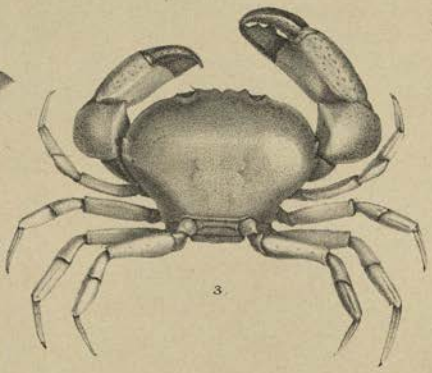


1.



2.

4 a.



3

3 a.

2 b.

3 b.

Robt Morgan del. et lith. West, Newman & Co imp.

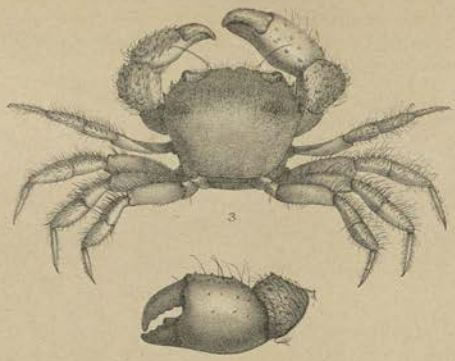
TRAPEZIA — PSEUDOZIUS — SPHÆROZIUS.

PLATE XIII.

PLATE XIII.

		Diam.	Page
Fig. 1. *Pilumnus africanus*, A. Milne Edwards, adult male,	× nearly	2	150
Fig. 1*a*. Chelipede,	×	2½	
Fig. 1*b*. Post-abdomen of the male,	×	4	
Fig. 2. *Pilumnus brasiliensis*, n. sp., female,	×	3	151
Fig. 2*a*. Frontal and orbital region,	× about	6	
Fig. 2*b*. Larger chelipede,	×	3½	
Fig. 2*c*. Smaller chelipede,	×	3½	
Fig. 2*d*. Post-abdomen of female,	×	4	
Fig. 3. *Pilumnus floridanus*, Stimpson, adult male (variety from Bahia),	×	3	152
Fig. 3*a*. Frontal and orbital region,	× about	5	
Fig. 3*b*. Chelipede of male,	×	3	
Fig. 3*c*. Larger chelipede of a female from Barra Grande (Station 122), showing the (perhaps sexual) difference in the tuberculation of the exterior surface,	×	4	
Fig. 3*d*. Post-abdomen of the male,	×	5	

3 c.


3

3 d.

3 b.

2 c.

2

2 b.

2 d.

3 a.

2 a.

1 b.

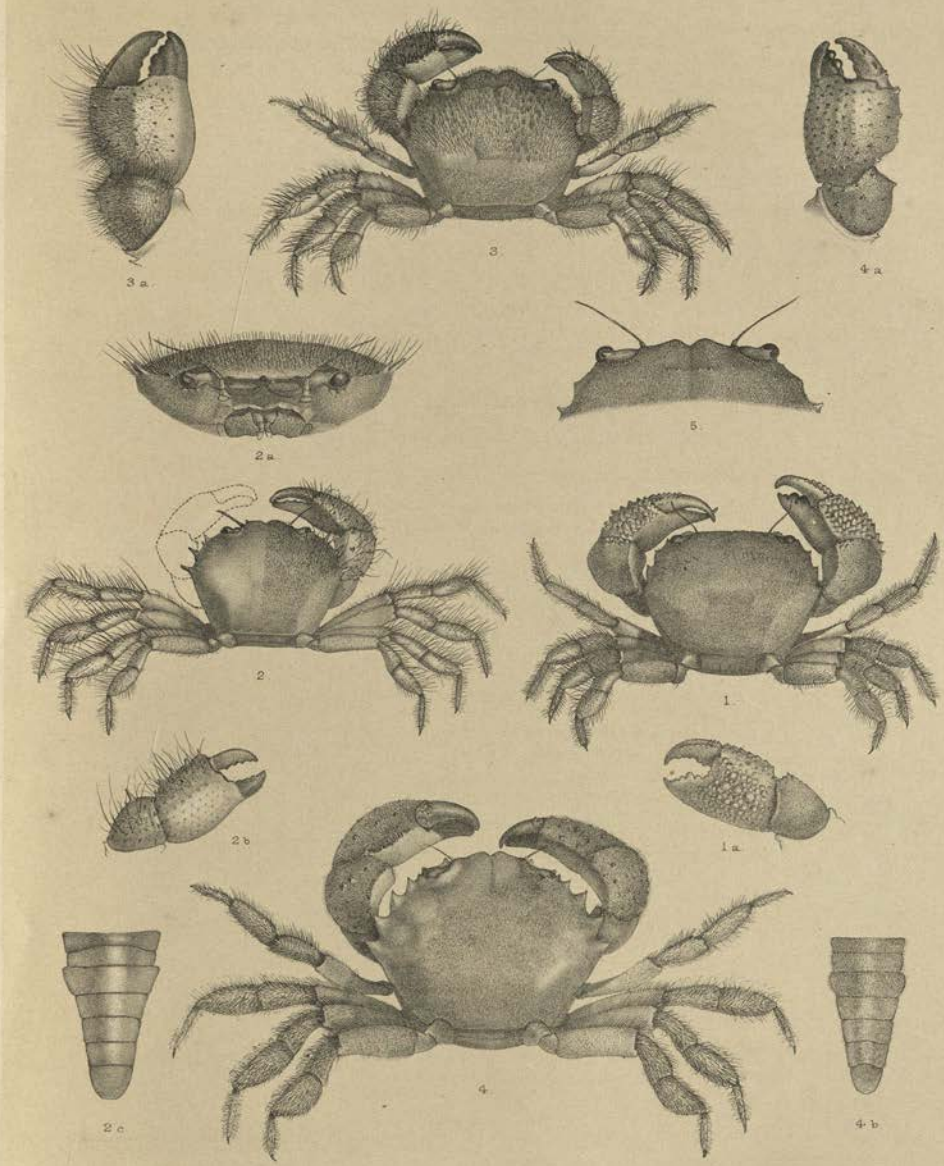
1

1 a.

PLATE XIV.

PLATE XIV.

			Diam.	Page
Fig. 1.	*Pilumnus dehaani*, Miers, female example,	×	3	155
	Fig. 1*a*. Larger chelipede,	×	3	
Fig. 2.	*Pilumnus normani*, n. sp., adult male,	×	2	156
	Fig. 2*a*. Anterior view of the frontal region, showing the form of the frontal lobes and orbits,	×	3	
	Fig. 2*b*. Exterior view of larger chelipede,	×	$2\frac{1}{2}$	
	Fig. 2*c*. Post-abdomen,	×	4	
Fig. 3.	*Pilumnus vestitus*, Haswell, adult female,	×	nearly 2	159
	Fig. 3*a*. Exterior view of larger chelipede,	×	$2\frac{1}{2}$	
Fig. 4.	*Pilumnus tomentosus* (?), Latreille, adult male,	×	2	160
	Fig. 4*a*. Exterior view of larger chelipede,	×	$1\frac{1}{2}$	
	Fig. 4*b*. Post-abdomen of the male,	×	$2\frac{1}{2}$	
Fig. 5.	*Pilumnus rufopunctatus*, Stimpson; dorsal view of part of the carapace, showing the form of the front, the denticulated orbits and granulated carapace,	×	about 5	160



Robt Morgan del. et lith.

PILUMNUS.

West, Newman & Co.ª imp.

PLATE XV.

PLATE XV.

		Diam.	Page
Fig. 1. *Neptunus* (*Amphitrite*) *spinipes*, n. sp., male example, . .	×	2½	178
Fig. 1*a*. Inferior view of the cervical region, showing the form of the antennæ and exterior maxillipedes, . . .	×	4	
Fig. 1*b*. Chelipede, ...	×	2	
Fig. 1*c*. Post-abdomen of the male, ...	×	3	
Fig. 2. *Cronius bispinosus*, n. sp., adult female, . . .	×	1½	188
Fig. 2*a*. Inferior view of the cervical region, showing the inferior orbital margin, antennæ, and exterior maxillipedes, . .	×	3	
Fig. 2*b*. Chelipede, ...	×	2	
Fig. 3. *Goniosoma variegatum*, var. *bimaculatum*, nov., adult male, .	×	1¼	191
Fig. 3*a*. Inferior view of the cervical region, showing the inferior orbital margin, antennæ, and exterior maxillipedes, &c., . .	×	2	
Fig. 3*b*. Chelipede, ...	×	1½	
Fig. 3*c*. Post-abdomen of the male	×	3	

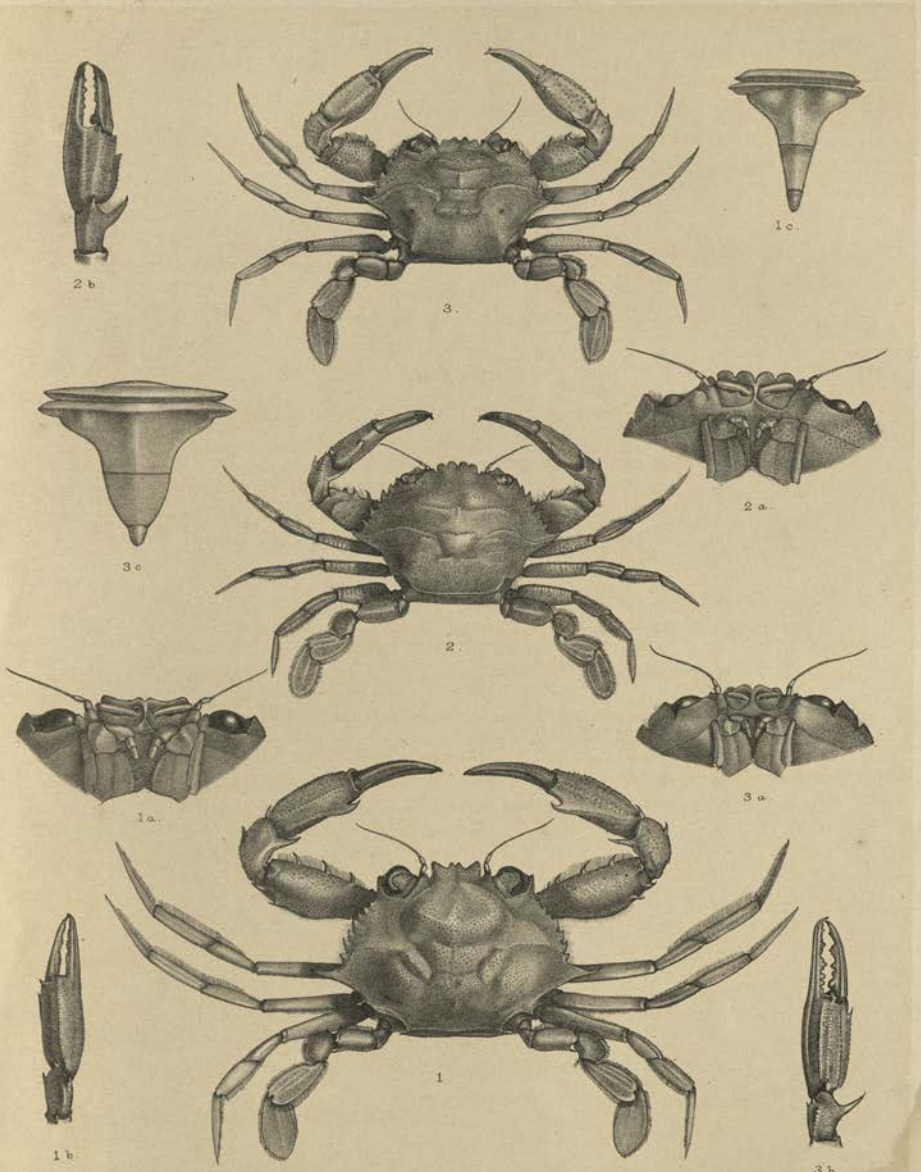
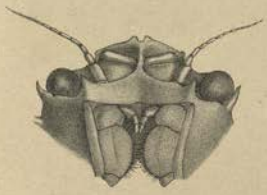

2 b
3.
1 c.
3 c
2.
2 a.
1 a.
3 a.
1
1 b
3 b.

PLATE XVI.

PLATE XVI.

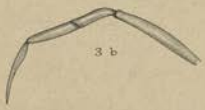
			Diam.	Page
Fig. 1. *Thalamita intermedia*, n. sp., carapace of adult male,		×	2	196
Fig. 1*a*. Inferior view of the cervical region, showing the inferior orbital margin, antennæ, and exterior maxillipedes,		×	2½	
Fig. 1*b*. Chelipede,		×	2	
Fig. 1*c*. One of the fifth (natatory) legs, showing the spinuliferous penultimate joint,		×	2½	
Fig. 1*d*. Post-abdomen of the male,		×		
Fig. 2. *Thalamita sexlobata*, n. sp., adult female,		×	3	196
Fig. 2*a*. Inferior view of the cervical region, showing the orbits, antennæ, and exterior maxillipedes,		×	4	
Fig. 2*b*. Chelipede,		×	4	
Fig. 2*c*. One of the fifth (natatory) legs, showing the unarmed inferior margin of the penultimate joint,		×	4	
Fig. 3. *Geryon (?) incertus*, n. sp., carapace,		×	about 7	224
Fig. 3*a*. Inferior view of the cervical region, showing the position of the antennæ with regard to the orbits and the exterior maxillipedes,		×	about 9	
Figs. 3*b*, 3*c*. Detached ambulatory legs, probably belonging to the same species.		×	6	



3 a.

1 d.

1.



3 b.

1 c.

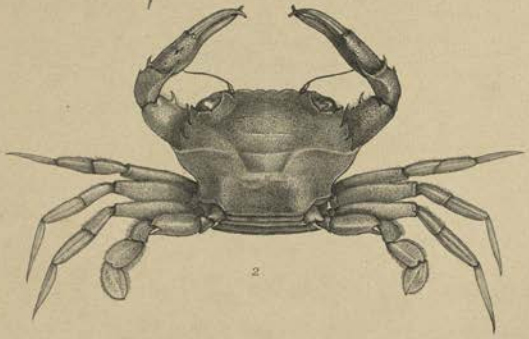
3.

2 c.

1 a.

2 a.

3 c.



2.

1 b.

2 b.

Robt Morgan del. et lith.

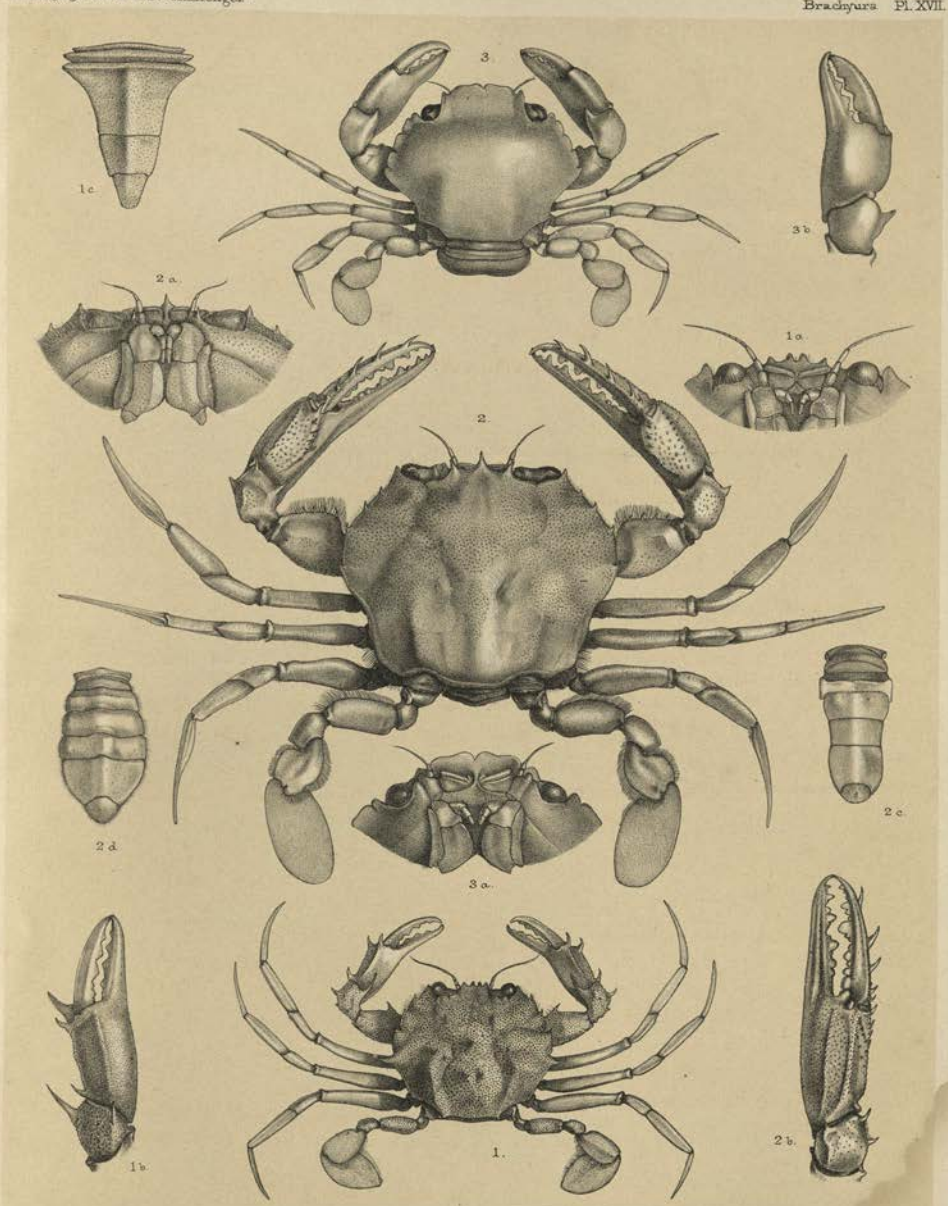
THALAMITA – GERYON.

West, Newman & Co imp.

PLATE XVII.

PLATE XVII.

		Diam.	Page
Fig. 1.	*Lupocyclus* (*Parathranites*) *orientalis*, n. sp., adult male, .	× 2	186
	Fig. 1*a*. Inferior view of part of the cervical region, showing the inferior orbital margin, antennæ, and the merus of the exterior maxillipedes, ...	× 4	
	Fig. 1*b*. Chelipede, ...	× 3	
	Fig. 1*c*. Post-abdomen of the male, ...	× 4	
Fig. 2.	*Platyonychus iridescens*, n. sp., adult female, . . .	nat. size.	202
	Fig. 2*a*. Inferior view of the cervical region, showing the antennæ and exterior maxillipedes, ...	nat. size.	
	Fig. 2*b*. Exterior view of the palm of the chelipede, . . .	nat. size.	
	Fig. 2*c*. Post-abdomen of the male (from a small specimen), . .	× 1½	
	Fig. 2*d*. Post-abdomen of the female, ...	nat. size.	
Fig. 3.	*Lissocarcinus lævis*, n. sp., adult female, . . .	× 3	205
	Fig. 3*a*. Inferior view of the cervical region, showing the antennæ and the exterior maxillipedes, ...	× 4	
	Fig. 3*b*. Chelipede, ...	× 4	



Robt Morgan del. et lith.

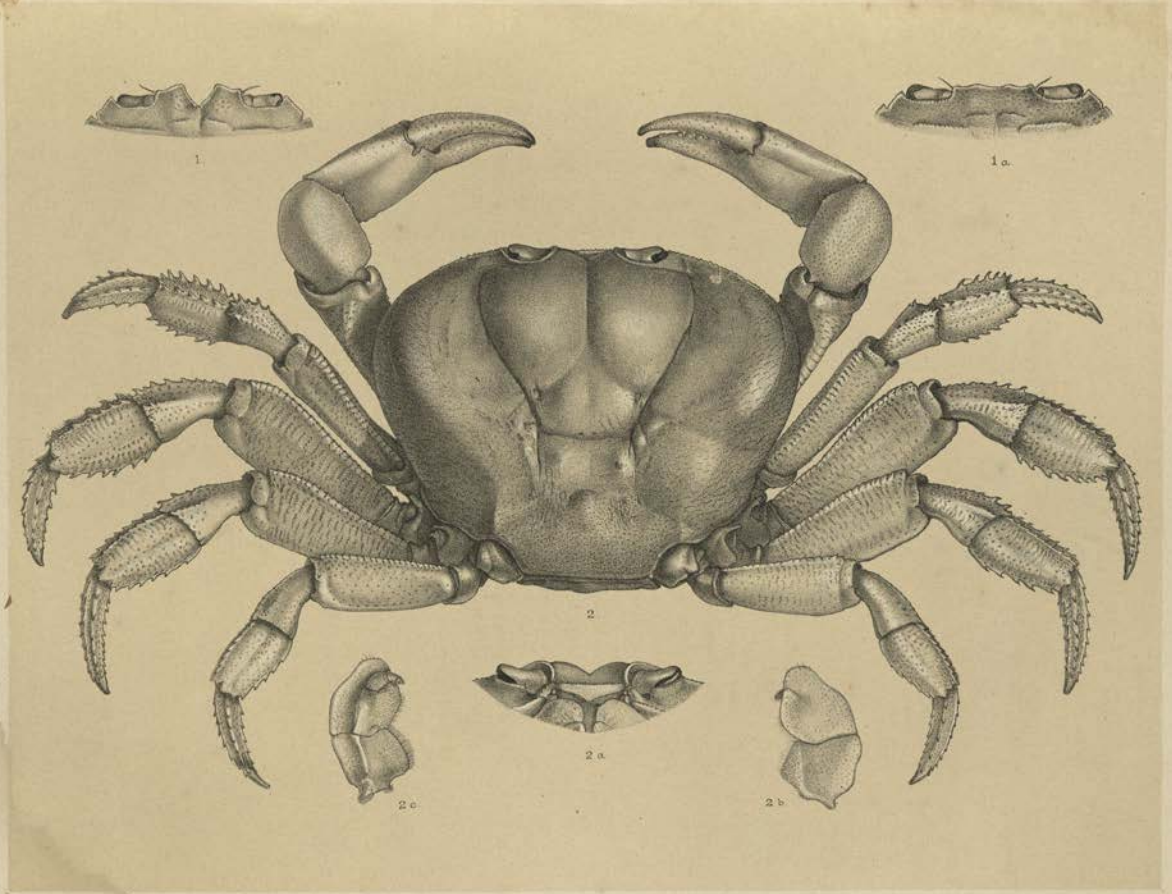
West, Newman & Co. imp.

LUPOCYCLUS – PLATYONYCHUS – LISSOCARCINUS.

PLATE XVIII.

PLATE XVIII.

	Diam.	Page
Fig. 1. *Thelphusa sinuatifrons*, Milne Edwards (?); dorsal view of the anterior part of the carapace of a male example, showing the (probably abnormally) bilobated front, . .	× 1½	214
Fig. 1*a*. Dorsal view of the anterior part of the carapace of a female taken with the preceding specimen, ...	× 1½	
Fig. 2. *Geocarcinus lagostoma*, Milne Edwards; adult female from Ascension Island, ...	nat. size.	218
Fig. 2*a*. Frontal region of the same specimen, showing the form of the orbits, ...	nat. size.	
Fig. 2*b*. Third maxillipede, exterior view, ...	nat. size.	
Fig. 2*c*. Third maxillipede, interior view, ...	nat. size.	



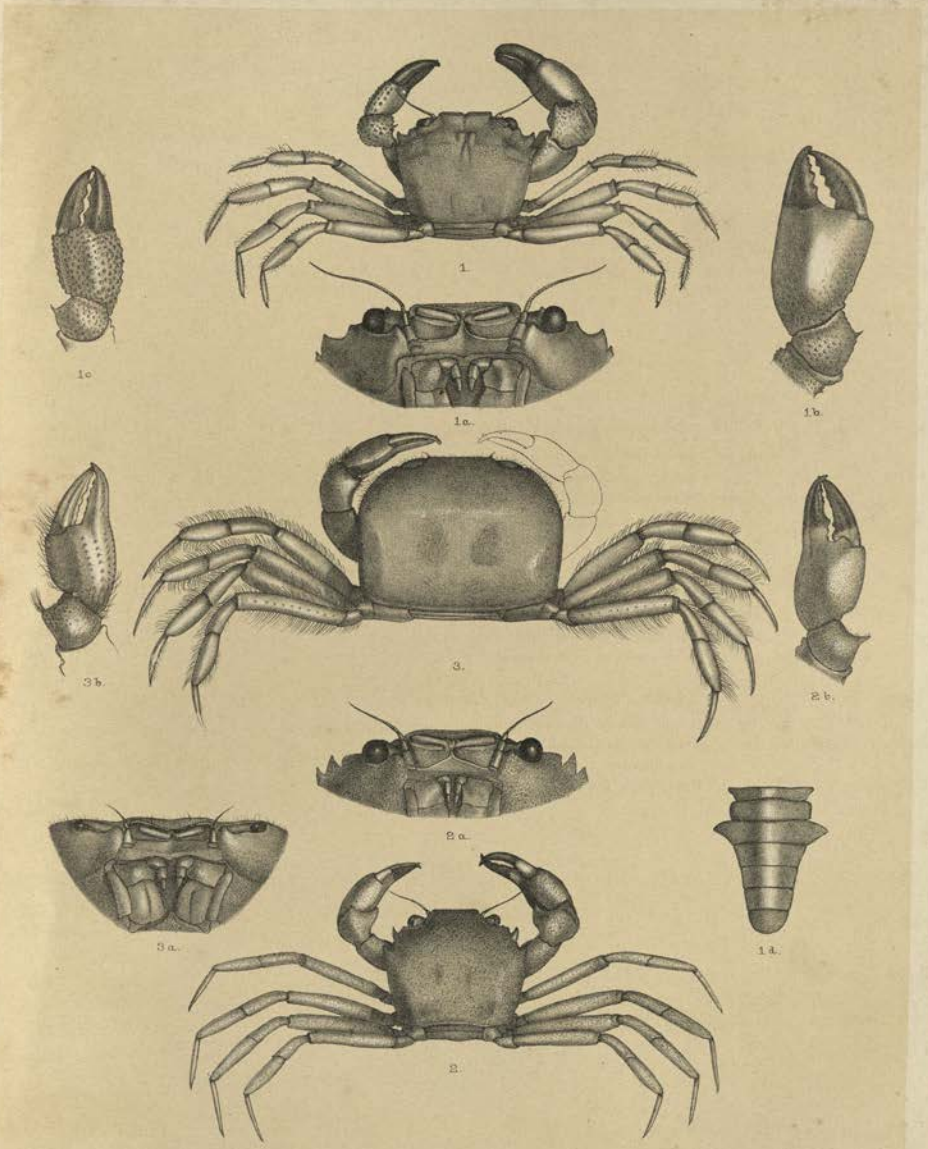
Robt Morgan del. et lith. West, Newman & Co imp.

THELPHUSA – GEOCARCINUS.

PLATE XIX.

PLATE XIX.

		Diam.	Page
Fig. 1. *Pilumnoplax heterochir* (Studer), adult male, . .	×	4	227
Fig. 1*a*. Anterior view of the frontal region of the carapace, showing the form of the frontal lobes and orbits, &c., . .	×	8	
Fig. 1*b*. Exterior view of larger chelipede, . . .	×	6	
Fig. 1*c*. Exterior view of smaller chelipede, . . .	×	6	
Fig. 1*d*. Post-abdomen of the male, ...	×	8	
Fig. 2. *Pilumnoplax abyssicola*, n. sp., male example, . .	×	nearly 3	228
Fig. 2*a*. Anterior view of the frontal region of the carapace, showing the form of the front, orbits, &c., . . .	×	6	
Fig. 2*b*. Exterior view of larger chelipede, . . .	×	4	
Fig. 3. *Ceratoplax ciliata*, Stimpson, female example, . .	×	about 5	234
Fig. 3*a*. Inferior view of the cervical region, showing the form of the inferior orbital margin, antennæ, and exterior maxillipedes, ...	×	6	
Fig. 3*b*. Exterior view of a chelipede, ...	×	5	



Robt Morgan del et lith.

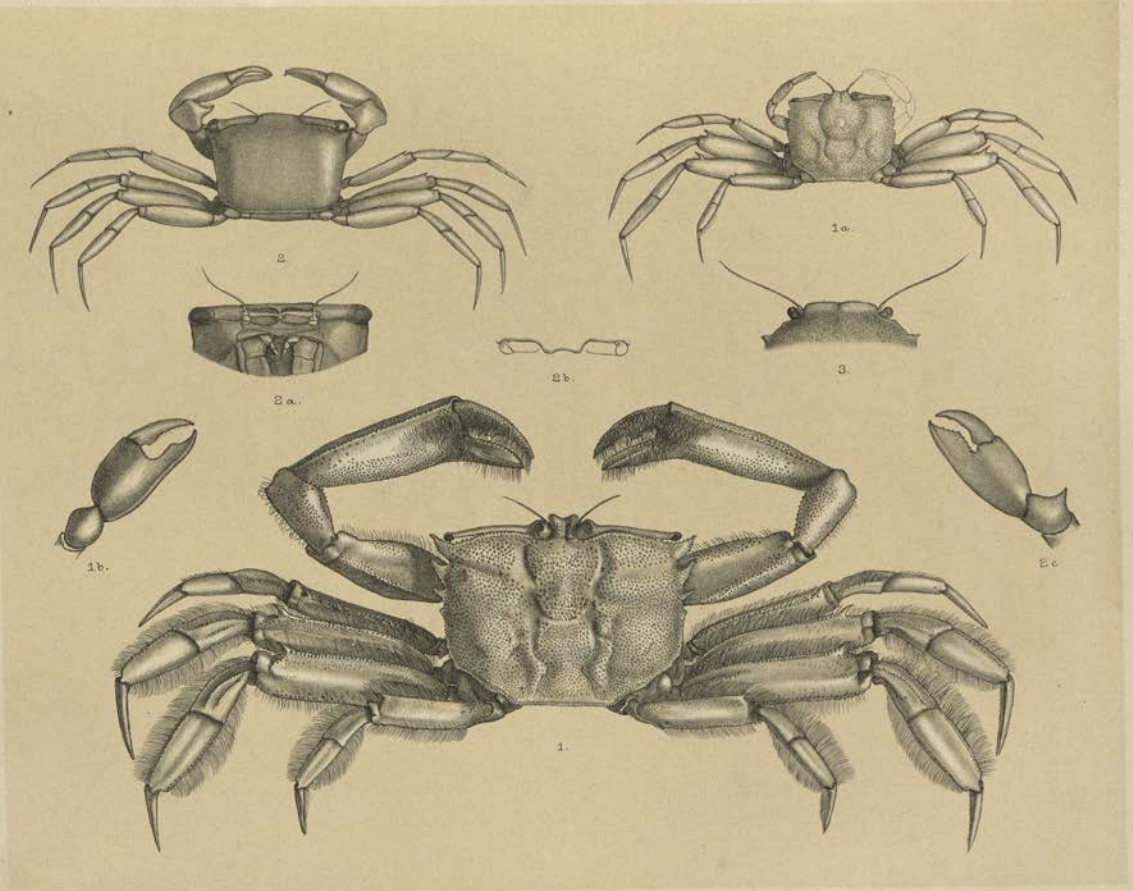
PILUMNOPLAX - CERATOPLAX.

West, Newman & Co. imp.

PLATE XX.

PLATE XX.

	Diam.	Page
Fig. 1. *Macrophthalmus serratus*, Adams and White (from an adult male example from the Philippines, in the collection of the British Museum), ...	nat. size.	250
Fig. 1*a*. Small male example, doubtfully referred to the same species, from Kobé, Japan, in the Challenger collection, . . .	× 2½	
Fig. 1*b*. Chelipede of the Japanese specimen, . . .	× 6	
Fig. 2. *Gonoplax sinuatifrons*, n. sp. (?), female example, . .	× 3	246
Fig. 2*a*. Anterior view of the cervical region, showing the antennæ and part of the maxillipedes, ...	× 4	
Fig. 2*b*. Anterior view of the front, showing the sinus in the frontal margin, ...	× 3	
Fig. 2*c*. Exterior view of a chelipede, ...	× 3½	
Fig. 3. *Bathyplax typhlus*, A. Milne Edwards, var. *oculiferus*, nov., frontal region and eyes, ...	× 2	230



Robt Morgan del. et lith.

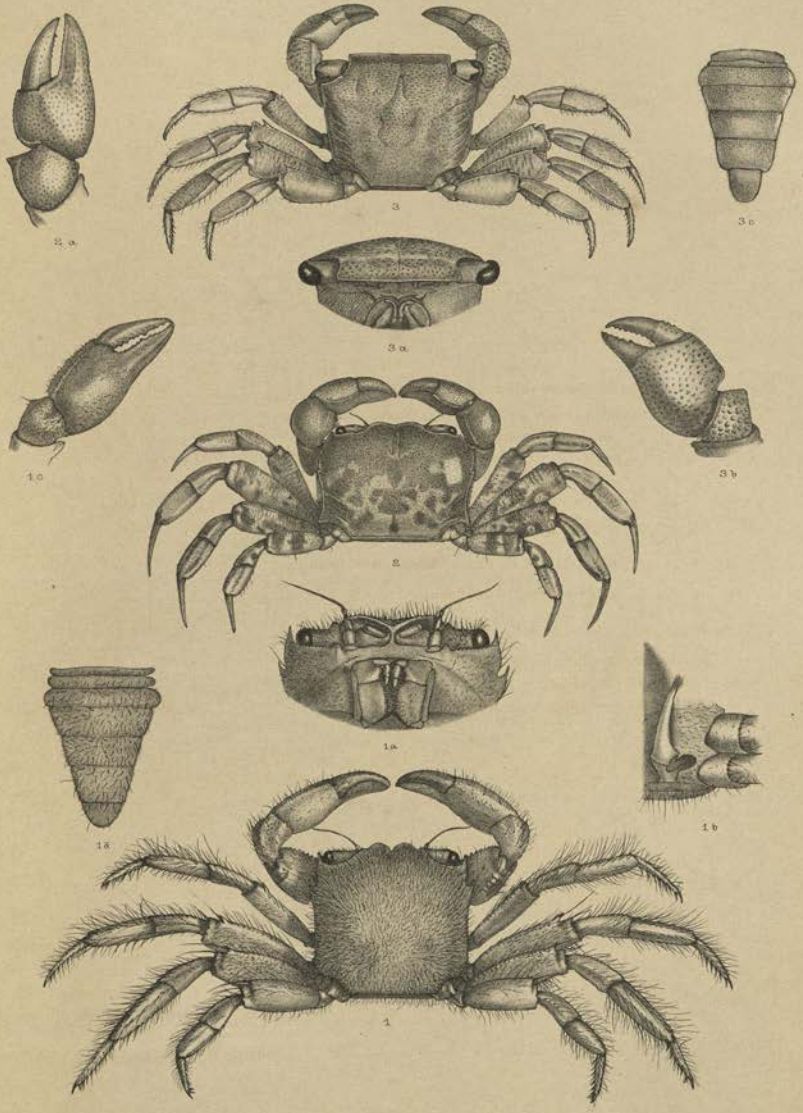
MACROPHTHALMUS - GONOPLAX - BATHYPLAX.

West, Newman & Co imp.

PLATE XXI

PLATE XXI.

	Diam.	Page
Fig. 1. *Lithocheira kingsleyi*, Miers, adult male example, . .	× about 3	232
Fig. 1*a*. Inferior view of the cervical region, showing the orbits, antennæ, and exterior maxillipedes, . . .	× 4	
Fig. 1*b*. Part of the sternal surface of the body, showing the position of the male verges, ...	× about 5	
Fig. 1*c*. Exterior view of larger chelipede, . . .	× 3	
Fig. 1*d*. Post-abdomen of the male, ...	× 5	
Fig. 2. *Helice latreillei*, Milne Edwards, var., adult female, .	× 2	268
Fig. 2*a*. Exterior view of a chelipede, ...	× 3	
Fig. 3. *Sesarma milleri*, A. Milne Edwards, male example, .	× 2½	270
Fig. 3*a*. Anterior view of the frontal region of the carapace, .	× 3	
Fig. 3*b*. Chelipede, ...	× 3½	
Fig. 3*c*. Post-abdomen of the male, ...	× about 4	



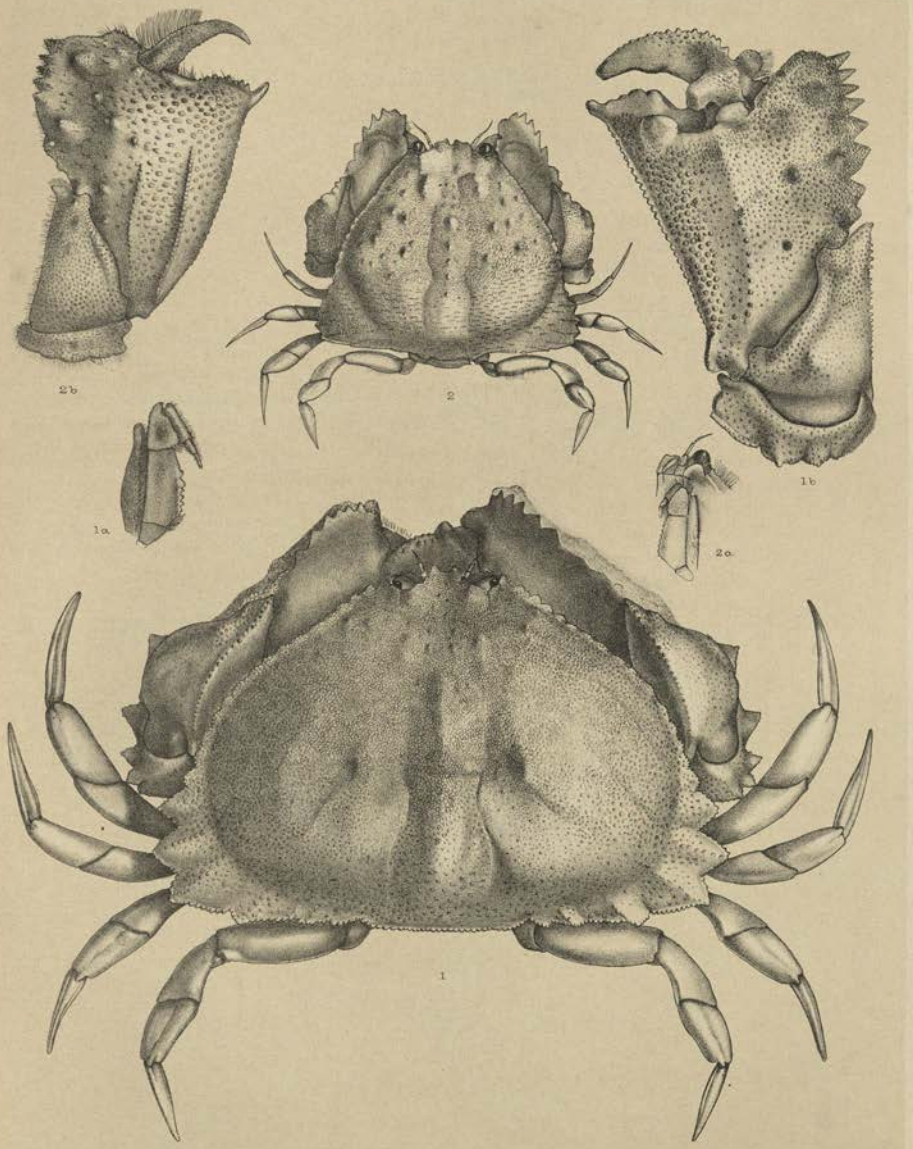
Robt Morgan del. et lith. West, Newman & Co. imp.

LITOCHEIRA—HELICE?—SESARMA.

PLATE XXII.

PLATE XXII.

		Diam.	Page
Fig. 1.	*Plagusia immaculata*, Lamarck, male example, . .	× 2	273
	Fig. 1*a*. Inferior view of the cervical region, showing the antennæ and maxillipedes, ...	× 4	
	Fig. 1*b*. Chelipede, ...	× 3	
	Fig. 1*c*. Post-abdomen of the male, ...	× 3	
	Fig. 1*d*. *Plagusia chabrus* (Linné), exterior view of a chelipede, .	nat. size.	
Fig. 2.	*Pinnotheres villosulus*, Guérin-Ménéville, adult female, . . .	× 3	277
	Fig. 2*a*. Anterior view of the cervical region, showing the form of the frontal lobes and position of the antennules and antennæ, .	× 6	
	Fig. 2*b*. Exterior maxillipede (interior view); considerably magnified.		
	Fig. 2*c*. Exterior view of a chelipede, ...	× 3½	



Robt Morgan del. et lith.

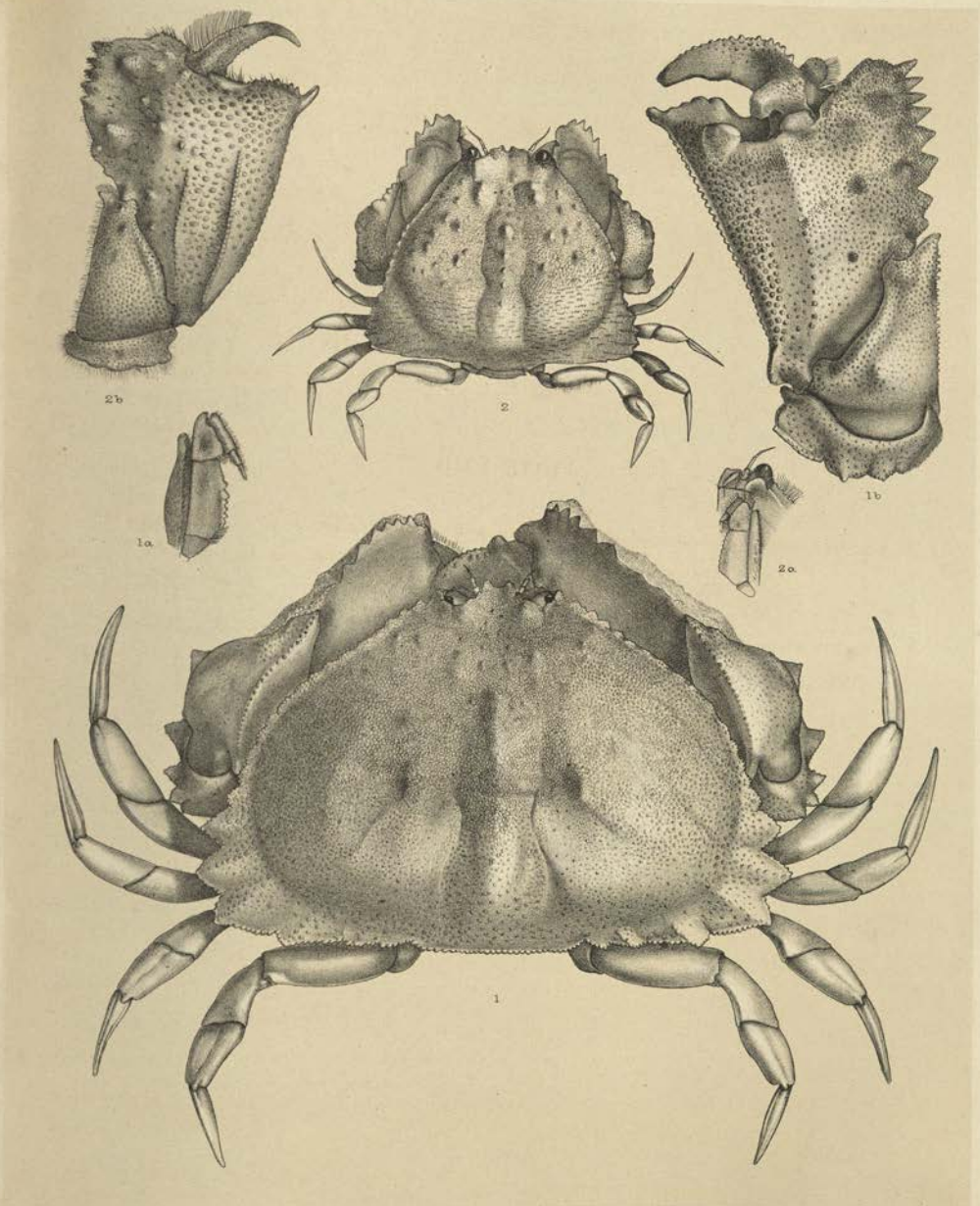
West, Newman & Co. imp.

CALAPPA.

PLATE XXIII.

PLATE XXIII.

	Diam.	Page
Fig. 1. *Calappa flammea* (Herbst), adult male from Simon's Bay,	nat. size.	284
Fig. 1*a*. Exterior maxillipede, showing the form of the merus-joint,	nat. size.	
Fig. 1*b*. Exterior view of a chelipede,	nat. size.	
Fig. 2. *Calappa depressa*, n. sp., female example,	× 2½	287
Fig. 2*a*. Part of the orbit and an exterior maxillipede of the same species,	× 3	
Fig. 2*b*. Exterior view of a chelipede,	× 4	



Robt Morgan del. et lith.

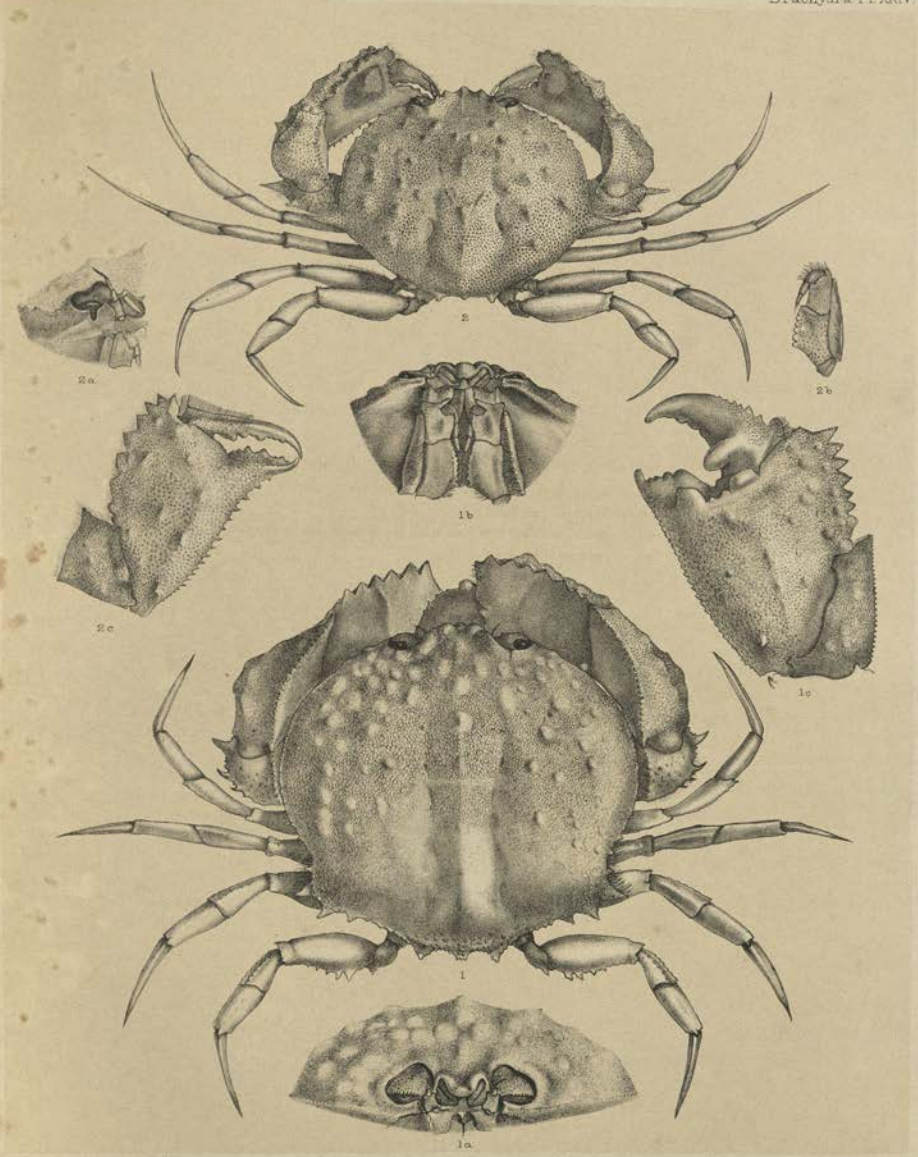
West, Newman & Co. imp.

CALAPPA.

PLATE XXIV.

PLATE XXIV.

		Diam.	Page
Fig. 1.	*Paracyclois milne-edwardsii*, n. gen. and sp., adult female, . .	× 1½	289
	Fig. 1*a*. Cervical region of the same species, anterior view, showing the form of the front and orbits, ...	× 1½	
	Fig. 1*b*. Cervical region, inferior view, showing the form of the antennæ and exterior maxillipedes, ...	nat. size	
	Fig. 1*c*. Chelipede, ...	× 1½	
Fig. 2.	*Mursia curtispina*, n. sp., adult female, . . .	× 1½	291
	Fig. 2*a*. Orbit, showing the hiatus in the inferior margin, and the position of the basal antennal joint.	× 2	
	Fig. 2*b*. Exterior maxillipede, ...	× 2	
	Fig. 2*c*. Chelipede, ...	× 2	



Robt Morgan del. et lith.

West, Newman & Co imp.

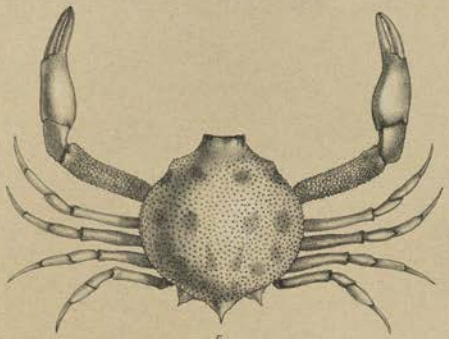
PARACYCLÖIS-MURSIA.

PLATE XXV.

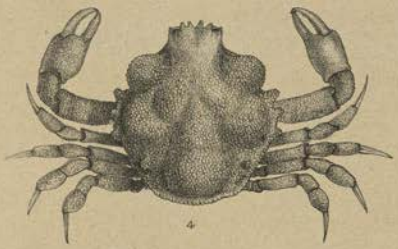
PLATE XXV.

		Diam.	Page
Fig. 1. *Ebalia tuberculosa* (A. Milne Edwards), adult male, . .	×	3½	306
Fig. 1*a*. Inferior view of the cervical region, showing the form of the exterior maxillipedes, ...	×	6	
Fig. 2. *Ebalia* (*Phlyxia*) *intermedia*, n. sp., male example, . .	×	4	308
Fig. 2*a*. Inferior view of the cervical region, showing the form of the exterior maxillipedes, ...	×	10	
Fig. 2*b*. Post-abdomen of the male, ...	×	6	
Fig. 2*c*. A (detached) ambulatory leg, ...	×	4	
Fig. 3. *Ebalia* (*Phlyxia*) *quadridentata*, Gray, var. *spinifera*, nov., male example, ...	×	4	309
Fig. 3*a*. Inferior view of the cervical region, showing the form of the exterior maxillipedes, ...	×	10	
Fig. 4. *Ebalia* (*Phlyxia*) *dentifrons*, n. sp., adult female, . .	×	3½	310
Fig. 4*a*. Inferior view of the cervical region, showing the form of the exterior maxillipedes, ...	×	6	
Fig. 5. *Persephona punctata* (Browne), male example, . . .	×	1½	312
Fig. 5*a*. Exterior maxillipede, ...	×	2	
Fig. 5*b*. Post-abdomen of the male, ...	×	2	

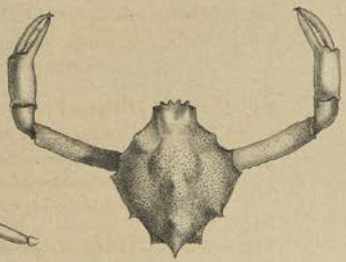
5b


5

2b

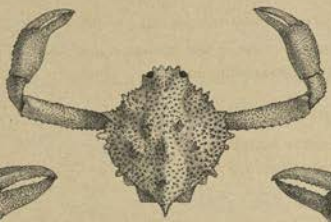

4

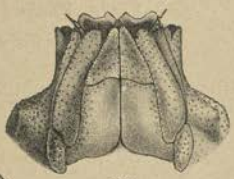
5a


2

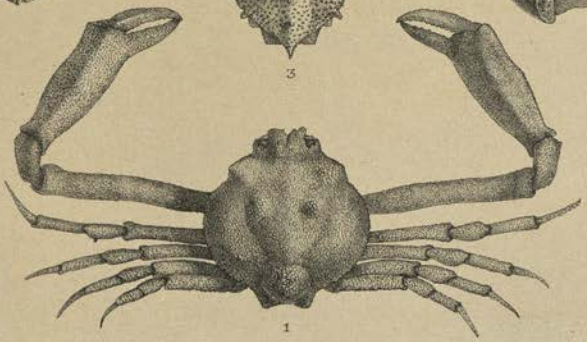
2c

1a


3


2a

4a


1

3a

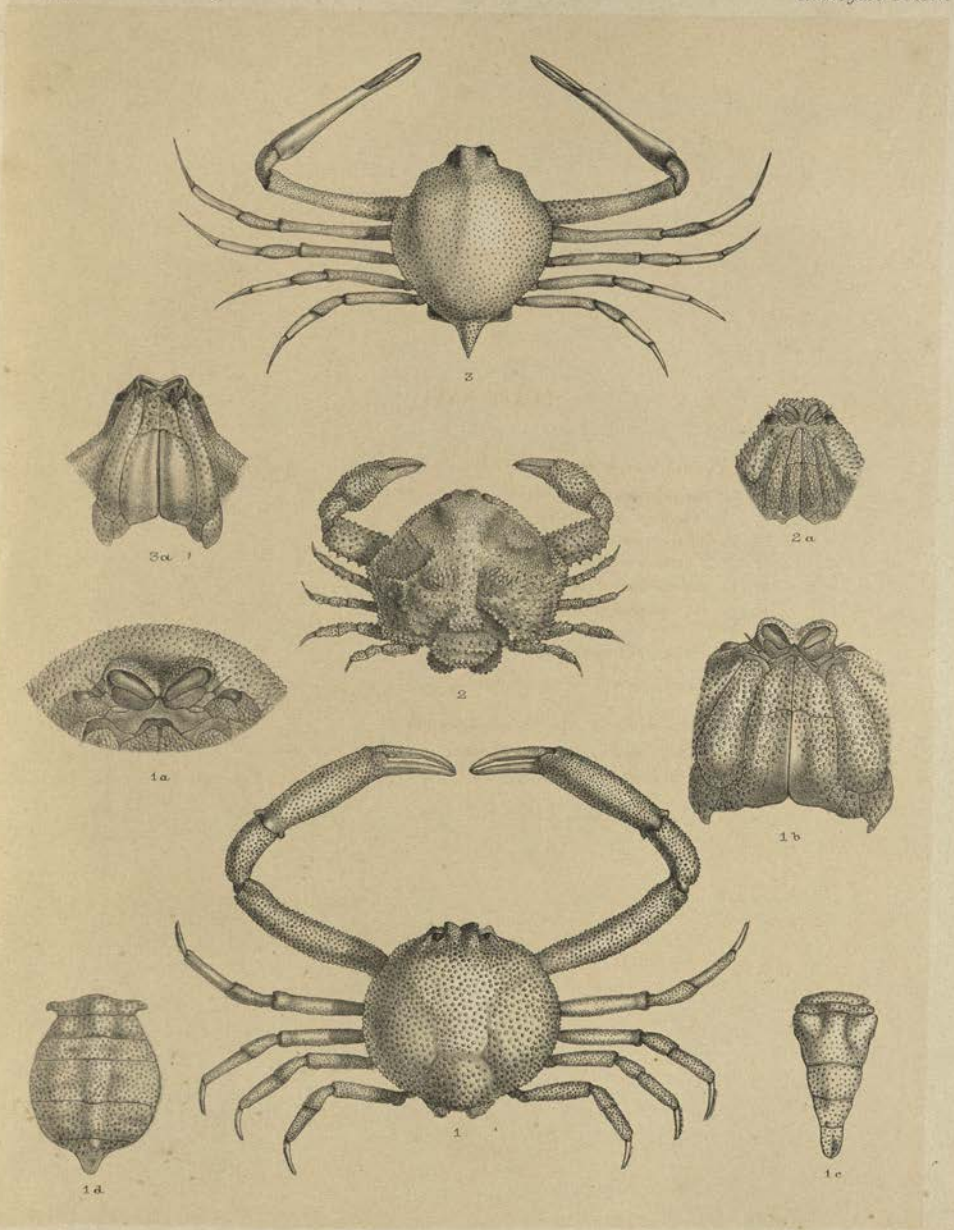
Rob.t Morgan del. et lith. West, Newman & Co.s imp.

EBALIA-PERSEPHONA.

PLATE XXVI.

PLATE XXVI.

			Diam.	Page
Fig. 1.	*Randallia granulata*, n, sp., adult male, . . .	×	1½	317
	Fig. 1*a*. Anterior view of the cervical region, showing the form of the front and orbits, ...	×	about 4	
	Fig. 1*b*. Inferior view of the cervical region, showing the form of the exterior maxillipedes, ...	×	4	
	Fig. 1*c*. Post-abdomen of the male, ...	×	2	
	Fig. 1*d*. Post-abdomen of the female, ...	×	2	
Fig. 2.	*Lithadia cariosa*, Stimpson, var., male example, . .	×	5	319
	Fig. 2*a*. Inferior view of the cervical region, . . .	×	about 7	
Fig. 3.	*Iliacantha intermedia*, n. sp., female example, . .	×	about 2½	302
	Fig. 3*a*. Inferior view of the cervical region, showing the form of the exterior maxillipedes, . . .	×	4	



Rob.t Morgan del. et lith.

West, Newman & C.o imp.

RANDALLIA-LITHADIA-ILIACANTHA.

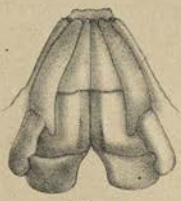
PLATE XXVII.

PLATE XXVII.

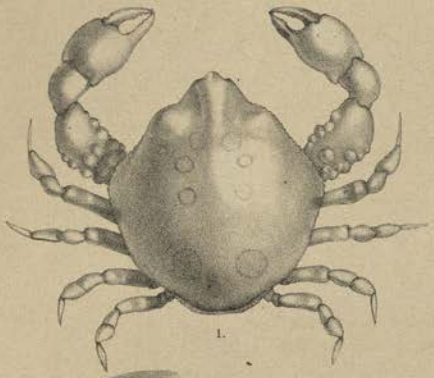
			Diam.	Page
Fig. 1.	*Leucosia australiensis*, n. sp., adult male, . . .	×	$2\frac{1}{2}$	322
	Fig. 1*a*. Thoracic sinus of the same species, ...	×	4	
	Fig. 1*b*. Inferior view of the cervical region, showing the form of the exterior maxillipedes, ...	×	$2\frac{1}{2}$	
	Fig. 1*c*. Post-abdomen of the male, ...	×	4	
Fig. 2.	*Leucosia haswelli*, n. sp., adult female, ...	×	$1\frac{1}{2}$	324
	Fig. 2*a*. Thoracic sinus, showing the disposition of the tubercles, .	×	3	
	Fig. 2*b*. Inferior view of the cervical region, showing the form of the exterior maxillipedes, ...	×	4	
Fig. 3.	*Leucosia craniolaris* (Linné), adult male, . . .	×	3	325
	Fig. 3*a*. Thoracic sinus, ...	×	4	
	Fig. 3*b*. Post-abdomen of the male, ...	×	4	

1 b.

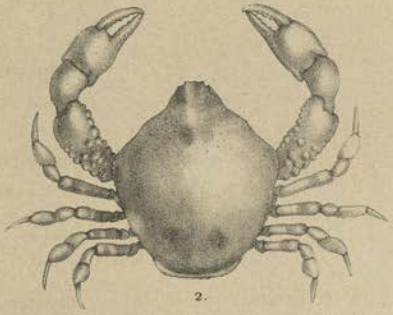
1 a.



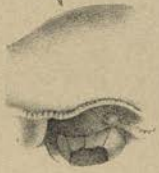
2 b.



1.

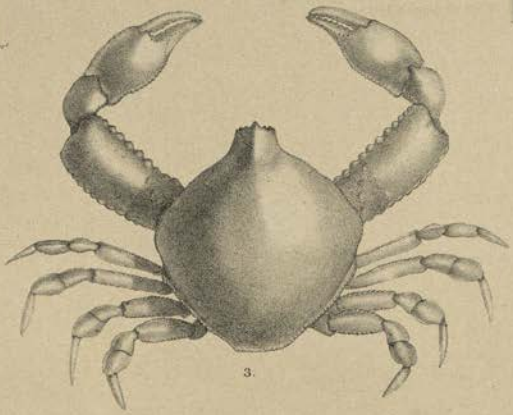


2.



3 a.

2 a.



3.

1 c.

3 b.

Robt Morgan del. et lith.

West, Newman & Co.t imp.

LEUCOSIA.

PLATE XXVIII.

PLATE XXVIII.

			Diam.	Page
Fig. 1.	*Ethusa orientalis*, n. sp., adult male, . . .	×	about 2	330
	Fig. 1*a*. Anterior view of the cervical region, showing the form of the front, antennules, antennæ, and exterior maxillipedes, .	×	3	
	Fig. 1*b*. Post-abdomen of the male, ...	×	3	
	Fig. 1*c*. Exterior view of larger chelipede, . . .	×	$2\frac{1}{2}$	
	Fig. 1*d*. Exterior view of smaller chelipede, . . .	×	$2\frac{1}{2}$	
	Fig. 1*e*. Post-abdomen of a male example with subequal chelipedes, .	×	3	
Fig. 2.	*Ethusa* (*Ethusina*) *challengeri*, n. sp., adult female, .	×	2	331
	Fig. 2*a*. Inferior view of the cervical region, showing front, antennæ, and maxillipedes, ...	×	$3\frac{1}{2}$	
	Fig. 2*b*. Exterior view of larger chelipede, . . .	×	$3\frac{1}{2}$	
	Fig. 2*c*. Post-abdomen of the female, ...	×	3	

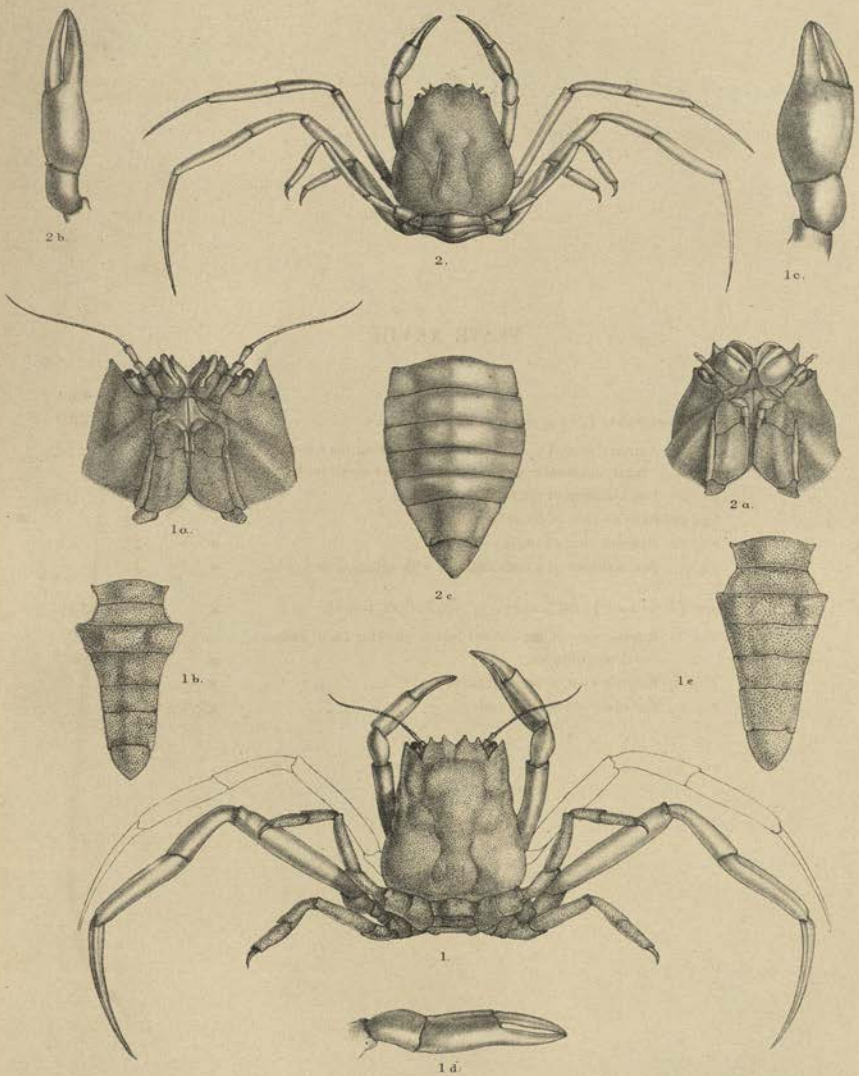
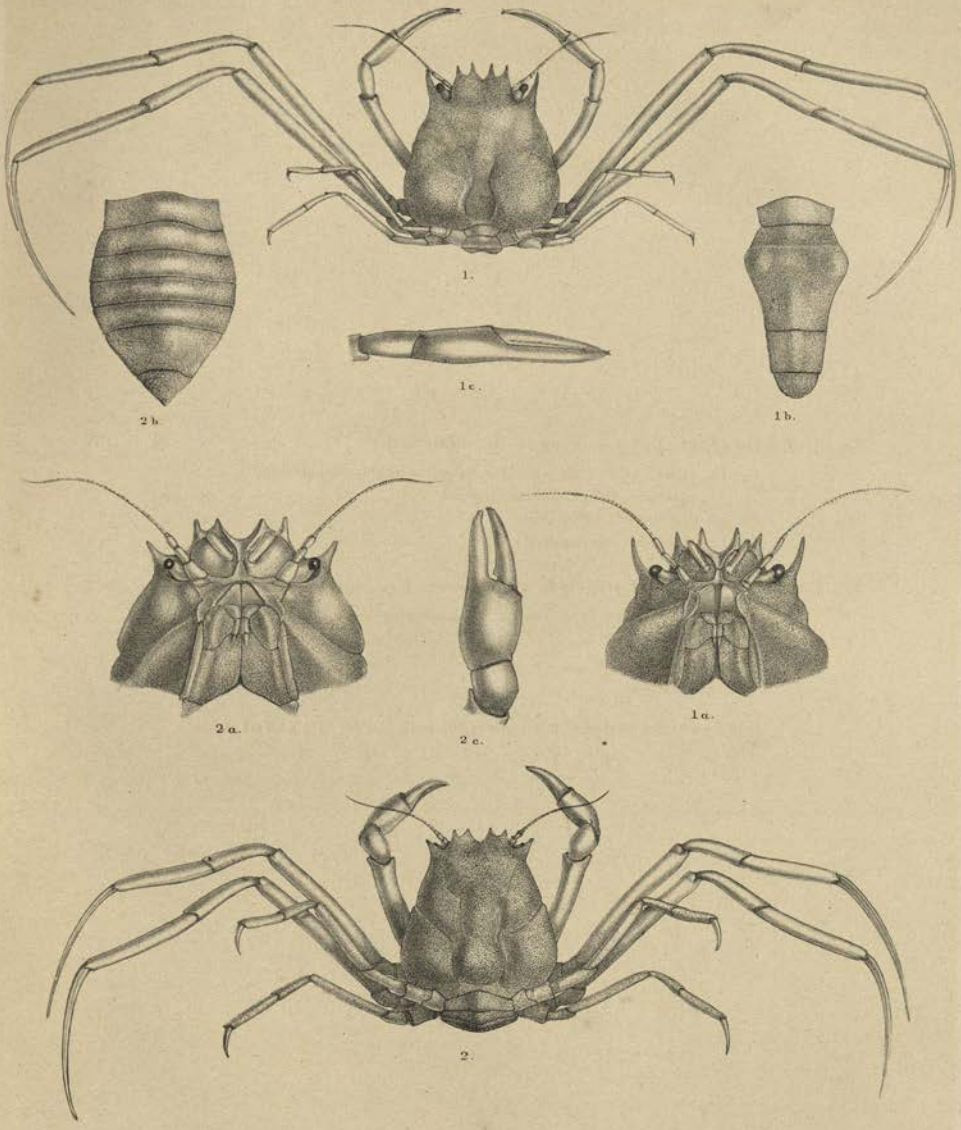

2 b.
2.
1 c.
1 a.
2 c.
2 a.
1 b.
1 e.
1.
1 d.

PLATE XXIX.

PLATE XXIX.

			Diam.	Page
Fig. 1.	*Ethusa* (*Ethusina*) *gracilipes*, n. sp., adult male,[1] . .	×	$3\frac{1}{4}$	332
	Fig. 1*a*. Inferior view of the cervical region, showing the eyes, antennules, antennæ, and exterior maxillipedes, . . .	×	5	
	Fig. 1*b*. Post-abdomen of the male, ...	×	5	
	Fig. 1*c*. Chelipede; exterior view, ...	×	4	
Fig. 2.	*Ethusa* (*Ethusina*) *gracilipes*, var. *robusta*, nov., adult female, .	×	2	333
	Fig. 2*a*. Inferior view of the cervical region, showing the eyes, antennules, &c., ...	×	$3\frac{1}{2}$	
	Fig. 2*b*. Post-abdomen, ...	×	$3\frac{1}{4}$	
	Fig. 2*c*. Chelipede, ...	×	3	

[1] In the text the reference to this species is incorrectly given as "Pl. XXVIII. fig. 3."



Robt Morgan del. et lith.

West, Newman & Co. imp.

ETHUSA.

THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY.

REPORT on the POLYZOA collected by H.M.S. Challenger during the years 1873–76. By GEORGE BUSK, F.R.S., V.P.L.S., &c.

PART II.—The CYCLOSTOMATA, CTENOSTOMATA, and PEDICELLINEA.

INTRODUCTION.

So much has been written of late years concerning the Polyzoa, that it is not possible for me here to name all those to whom I have been indebted for assistance in the preparation of this Report, but among the most important recent contributions to our knowledge of all the three orders now under consideration, must be mentioned the valuable works of Mr. Hincks[1] and Professor Smitt.[2] To M. L. Joliet[3] we owe papers, both anatomical and descriptive, on the Polyzoa of the French Coast. Mr. P. H. Macgillivray,[4] has described and figured many new species of CYCLOSTOMATA belonging to the Australian region. Mr. Waters[5] has given descriptions of recent species from the Bay of Naples, as well as of fossil Australian species; and Dr. J. Jullien[6] of species collected in the

[1] Hincks, Brit. Mar. Polyz., 1880, and various papers in *Ann. and Mag. Nat. Hist.*, &c.

[2] Smitt, Hafs-Bryoz. Uteckl. och Fettkr., 1864; Bryoz. Mar., 1867; Kritisk Förteckn., 1865, 1871; Florid Bryoz., pt. i., 1872.

[3] Joliet, Les Bryozoaires des Côtes de France, *Archives d. Zool. Expér.*, t. vi., p. 193, 1877.

[4] Macgillivray, P. H., *Nat. Hist. Vict.*, decades iv. and vii.; *Proc. Roy. Soc. Vict.*, Polyzoa, parts iv. vi., vii., viii., ix.

[5] Waters, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. iii.; *Quart. Journ. Geol. Soc.*, vol. xl. p. 674, 1884.

[6] Jullien, *Bull. Soc. Zool. de France*, t. vii., 1882.

Atlantic by the "Travailleur." With regard to the PEDICELLINEA I must express my obligations to Drs. Nitsche,[1] Hatschek,[2] Salensky,[3] &c., for the information derived from their researches.

The total number of species enumerated in this part of my Report is forty-six, of which number thirteen still appear to me to be new, and three or four others have only been described and named since the Challenger collection was made; if I have overlooked the descriptions of any others I can only express my regret that it should be so, as I have made every endeavour to keep pace with the recent additions to our knowledge on the subject.

Of the number of species above mentioned by far the greater part, viz., thirty-three, belong to the sub-order CYCLOSTOMATA, of which, however, only five are new. Of the CTENOSTOMATA there are only eleven species in all, but of these seven are new, though none of them present any new generic type; this very much larger proportion of new species can be accounted for probably by the fact that this sub-order has been much less fully studied hitherto than either the CHEILOSTOMATA or CYCLOSTOMATA. Belonging to the PEDICELLINEA, only two species have come under my notice, of which but one is now described for the first time, the other having been named by Mr. Hincks in 1884.

CLASSIFICATION.

1. The arrangement of the sub-order CYCLOSTOMATA followed in this Report, as exemplified in the accompanying Table (see p. viii.), is nearly the same as that adopted in my Monograph of the Crag Polyzoa, 1857, and in the British Museum Catalogue, pt. iii., 1875; the number of species procured by H.M.S. Challenger belonging to this sub-order not having been sufficiently large to lead to any material change in it.

2. In the sub-order CTENOSTOMATA, again, the number of species in the collection was too small to justify the attempt at forming any different general scheme, and therefore I have followed, as nearly as may be, the arrangement adopted by Mr. Hincks in his British Marine Polyzoa, only differing from him in the definition of the two principal divisions.

3. With respect to the order PEDICELLINEA all that I need say is, that though the total number of species collected on the voyage only amounted to two, they have appeared to me to deserve recognition as a new generic type, to which I have given the name of *Ascopodaria*, but it does not seem necessary for me to enter into any disquisition as to a scheme of classification beyond what has been already written by Mr. Hincks, Dr. Nitsche, Professor Smitt and others.

[1] Nitsche, *Zeitschr. f. wiss. Zool.*, Bd. xx. p. 343, 1870.
[2] Hatschek, *Zeitschr. f. wiss. Zool.*, Bd. xxix. p. 502, 1877.
[3] Salensky, *Ann. d. Sci. Nat.*, sér. 6, t. v. p. 27, 1877.

Distribution.

1. *Geographical.*

I have thought it convenient for the sake of uniformity, and to facilitate reference, to arrange the species enumerated in this second part of the Report into the following seven divisions of the ocean, in the same manner that the Cheilostomata were divided in the first part.

A. North Atlantic Region, between the parallels of 70° W. and 20° E.
B. South Atlantic Region, from 70° W. to 20° E.
C. South Indian or Kerguelen Region, from 20° E. to 110° E.
D. Australian Region, from 110° E. to 160° W. and S.
E. Philippine or Japanese Region, from 110° E. to 160° W. and N.
F. North Pacific Region, from 160° W. to the coast of North America.
G. South Pacific Region, from 160° W. to 70° W.; but from this region no species belonging to any of the orders referred to in this part of the Report were procured.

In the following List, to the names of the species procured at each Station a reference is added, by corresponding letters, to the other regions in which it was found, so that its geographical distribution may be seen at a glance.

2. *Bathymetrical.*

The Stations in each geographical region, in the List, are arranged in bathymetrical order, beginning with those of the greatest depth; it will be seen that only two species of Cyclostomata occur at depths greater than 1000 fathoms, viz., one at 1600 and one at 1450, the former, however, also being found at various depths, from 50 fathoms downwards; four or five others were found at 450 to 600 fathoms, but by far the larger number were procured at between 50 and 150 fathoms, and ten in shallow water. Of the Ctenostomata only three occurred at depths as great as 150 fathoms, the remaining eight having all come from depths less than 40 fathoms. The only two species belonging to the Pedicellinea group both came from 150 fathoms.

3. *Geological.*

To the sub-order Cyclostomata belong most of the oldest fossil Polyzoa that have been found up to this time, whilst "as yet we have no clear evidence that Cheilo-

stomatous types existed in Palæozoic times;"[1] although in the Mesozoic and Tertiary strata fossil CHEILOSTOMATA are numerous. The palæontological evidence as to the antiquity of the CYCLOSTOMATA is fully confirmed and strengthened by the embryological researches that have recently been so carefully and accurately made by various authors; for instance M. Barrois[2] says that the study of the structure of the larva and of the formation of the cell coincides with palæontology in furnishing us with perfectly concordant results, which are conclusive as to the antiquity of the CYCLOSTOMATA. Many of the species even have a wide distribution in time, for out of the thirty-three included in this collection, fourteen have already been identified in the fossil state.

No fossil forms belonging either to the CTENOSTOMATA or to the Entoproctan Polyzoa have hitherto been identified, but Mr. Vine has thrown out a hint, in a paper on *Ascodictyon*,[3] that perhaps *Ascodictyon filiforme* may be a primitive representative of the stoloniferous Vesiculariadæ, or possibly of the Entoprocta. That this latter order is of great antiquity is also confirmed by its embryonic history, for the same eminent authority, above quoted, M. Barrois,[4] after the most careful and elaborate comparison of the larvæ of the various Ectoproctan and Entoproctan groups, comes to the conclusion that "the larvæ of Entoprocta represent the primitive type from which all the others are derived."

A.—NORTH ATLANTIC REGION.

STATION 75, lat. 38°·38′ N., long. 28° 28′ 30″ W.; 450 fathoms; volcanic mud.

Idmonea milneana, C. | *Idmonea irregularis.*

CAPE VERDE ISLANDS, 100 to 120 fathoms.

Hornera frondiculata.

STATION 36, lat. 32° 7′ 25″ N., long. 65° 4′ W., off Bermuda; 30 fathoms; coral.

Crisia denticulata, var. *patagonica.* | *Amathia lendigera.*

CAPE VERDE ISLANDS, 10 fathoms.

Crisia conferta, D.

STATION 109, 0° 55′ 38″ N., long. 29° 22′ 35″ W., off St. Paul's Rocks; shallow water.

Crisia denticulata, B, D.

[1] Vine, *Quart. Journ. Geol. Soc.*, vol. xl. p. 332, 1884.
[2] Barrois, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. x. p. 391 (footnote).
[3] Vine, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xiv. p. 87.
[4] Barrois, *loc. cit.*, p. 401.

B.—SOUTH ATLANTIC REGION.

STATION 320, lat. 37° 17′ S., long 53° 52′ W.; 600 fathoms; green sand.

Crisia acuminata.
Idmonea marionensis, C.
Idmonea fissurata.
Hornera lichenoides.

STATION 135, lat. 37° 1′ 50″ S.; long. 12° 19′ 10″ W., off Tristan da Cunha Islands; 60 to 360 fathoms.

Crisia biciliata.
Crisia denticulata, A, D.
Crisia acuminata.
Crisia cylindrica.
Idmonea atlantica.
Alecto granulata.
Diastopora patina.
Lichenopora fimbriata.
Lichenopora hispida.
Fasciculipora ramosa.
Ascopodaria discreta.

STATION 142, lat. 35° 4′ S., long. 18° 37′ E.; 150 fathoms; green sand.

Alcyonidium flustroides.

OFF BAHIA, 10 to 40 fathoms.

Amathia distans.
Amathia brasiliensis.
Farrella atlantica.

SIMON'S BAY, Cape of Good Hope; 18 fathoms.

Idmonea atlantica.

STATION 315, lat. 51° 40′ S., long. 57° 50′ W.; 12 fathoms; sand and gravel

Tubulipora flabellaris.
Tubulipora fimbria.

C.—SOUTH INDIAN OR KERGUELEN REGION.

STATION 147, lat. 46° 16′ S., long. 48° 27′ E.; 1600 fathoms; Diatom ooze.

Idmonea marionensis, B.

PRINCE EDWARD ISLAND, 80 to 150 fathoms.

Crisia holdsworthii.
Idmonea marionensis, B.
Idmonea milneana, A.
Pustulopora proboscidea.

STATION 149, off Kerguelen Islands; 28 to 105 fathoms.

Crisia eburnea, var. laxa.
Idmonea atlantica.

STATION 151, off Heard Island; 75 fathoms; volcanic mud.

Idmonea marionensis, B. | *Pustulopora proboscidea.*
Hornera violacea. | *Pustulopora deflexa.*
Supercytis tubigera.

STATION 144A, lat. 46° 48′ S., long. 37° 49′ 30″ E., Marion Islands; 69 fathoms; volcanic mud.

Crisia holdsworthii. | *Idmonea australis*, D.
Idmonea marionensis, B. | *Pustulopora proboscidioides.*

D.—AUSTRALIAN REGION.

STATION 176, lat. 18° 30′ S., long. 173° 52′ E.; 1450 fathoms; Globigerina ooze.
Crisia elongata.

STATION 163A, lat. 36° 59′ S., long. 150° 20′ E., off Twofold Bay; 150 fathoms; green mud.

Crisia conferta, A. | *Amathia tortuosa.*
Amathia spiralis. | *Ascopodaria fruticosa*

STATION 167, lat. 39° 32′ S., long. 171° 48′ E.; 150 fathoms; blue mud.
Supercytis digitata.

STATION 162, lat. 39° 10′ 30″ S., long. 146° 37′ E., Bass Strait; 38 fathoms; sand and shells.

Pustulopora regularis. | *Amathia spiralis.*

STATION 163B, lat. 33° 51′ 15″ S., long. 151 22° 15″ E., off Port Jackson; 35 fathoms; hard ground.

Idmonea australis, C. | *Hornera foliacea.*

STATION 161, lat. 38° 22′ 30″ S., long. 144° 36′ 30″ E., off Port Philip; 33 fathoms; sand.

Crisia acropora. | *Hornera foliacea.*
Amathia spiralis.

STATION 188, lat. 9° 59′ S., long. 139° 42′ E.; 28 fathoms; green mud.

Amathia semispiralis. | *Vesicularia papuensis.*
Cylindrœcium papuense.

STATION 172, lat. 20° 58′ S., long. 175° 9′ W., off Nukalofa, Tongatabu; 18 fathoms; coral mud.

Idmonea radians, F.

STATION 186, lat. 10° 30′ S., long. 142° 18′ E., off Cape York; 8 fathoms; coral mud.

Crisia denticulata, A, B. | *Idmonea eboracensis.*

Amathia connexa.

E.—PHILIPPINE OR JAPANESE REGION.

OFF ZEBU, Philippine Islands.

Crisia denticulata, var. *gracilis.*

F.—NORTH PACIFIC REGION.

OFF HONOLULU, Sandwich Islands; 20 to 40 fathoms.

Idmonea radians, D.

G.—SOUTH PACIFIC REGION.

None.

MEASUREMENTS.

The metrical system is now so generally in use for scientific purposes that I have adopted it for all the measurements of the magnified figures, and they are accordingly given in millimetres or tenths of a millimetre. The figures are nearly all enlarged by 25 or 50 diameters, and scales are appended to all the plates.

Table of Classification.

Group A. ECTOPROCTA.

Sub-order II. CYCLOSTOMATA.

			PAGE
Division I. Articulata s. Radicata.			
	I. Crisiadæ, . .	*Crisia*, . . .	2
Division II. Inarticulata.			
Subdivision A. Erecta.	II. Idmoneidæ, . .	*Idmonea*, . .	9
		Hornera, . .	14
		Pustulopora, . .	18
Subdivision B. Adnata s. Decumbentia.	III. Tubuliporidæ, .	*Alecto*, . . .	22
		Tubulipora, . .	22
	IV. Diastoporidæ, .	*Diastopora*, . . .	24
	V. Lichenoporidæ, .	*Lichenopora*, . .	25
	VI. Frondiporidæ, . .	*Fasciculipora*, . .	27
		Supercytis, . .	28

Sub-order III. CTENOSTOMATA.

Division I. Halcyonellea.			
	I. Alcyonidulæ, .	*Alcyonidium*, . .	31
Division II. Vesicularina.			
	II. Vesiculariдæ, .	*Amathia*, . .	33
		Vesicularia, . .	36
		Farrella, . .	37
	III. Cylindrœcidæ, .	*Cylindrœcium*, .	38

Group B. ENTOPROCTA.

Order PEDICELLINEA.

	I. Pedicellinidæ, .	*Ascopodaria*, . .	4

DESCRIPTION OF GENERA AND SPECIES.

Group A. ECTOPROCTA.

Sub-Order II. CYCLOSTOMATA, Busk.

Cyclostomata, Bk., Smitt, Hincks, Auctt.
Tubuliporina, M.-Edwards, Johnst., &c.
Auloporina and *Myrioporina* (pars), Ehrenberg.
Cerioporina (pars), Bronn.
Centrifuginea (pars), d'Orbigny.
Millépores à cellules (pars), Blainville.

Character.—Zoœcia tubular, calcareous, partially free or wholly connate or immersed; aperture terminal, inoperculate.

Division I.—ARTICULATA seu RADICATA.

Radicellata, d'Orbigny, Hincks, Smitt, &c.
Articulatæ s. Radicatæ, Bk., Crag Polyz.

Character.—Zoarium branched, divided into distinct internodes by flexible chitinous joints; affixed by chitinous, or calcareous jointed stoloniform radical tubes. Zoœcia disposed in single or double longitudinal series, all facing in one direction.

Family I. Crisiadæ.

Les Crisies, M.-Edwards.
Crisiadæ, Johnst., Busk, &c.
Crisiidæ, Busk, Hincks, &c.
Crisieæ, Smitt.
Crisideæ, Reuss.
Crisidæ, d'Orbigny.

Character.—The only family.

The Family here contains :—

1. *Crisia.*

(1) *Crisia biciliata*, Macgilliv. (Pl. I. figs. 1, 2).
(2) *Crisia eburnea*, var. *laxa* (Pl. II. fig. 1).
(3) *Crisia denticulata*, Lamk. (Pl. II. fig. 3).
Crisia denticulata, var. *α*, *gracilis* (Pl. I. fig. 4).
Crisia denticulata, var. *β*, *patagonica*.
(4) *Crisia elongata*, M.-Edw. (Pl. I. fig. 3).
(5) *Crisia acuminata*, n. sp. (Pl. III. fig. 1).
(6) *Crisia acropora*, Bk.
(7) *Crisia holdsworthii*, Bk. (Pl. III. fig. 2).
(8) *Crisia conferta*, Bk. (Pl. II. fig. 5).
(9) *Crisia cylindrica*, n. sp. (Pl. II. figs. 2, 4).

1. *Crisia.*

Sertularia (pars), Linné.
Cellularia (pars), Pallas.
Cellaria (pars), Solander, Lamk.
Tibiana (pars), Lamk., Schweigger, Blainville, Lister.
Falcaria (pars), Oken, Gray.
Eucratea (pars), Esper, Lamx., Fleming, &c.
Crisia (pars), Lamx., Johnst., Gray, Auctt.
Crisidia (pars), M.-Edwards, Busk, d'Orbigny (1852).
Filicrisia, d'Orbigny (1851).

Character.—Zoœcia disposed in a single or double longitudinal series. Oœcia modified zoœcia, with a tubular aperture, walls punctate.

§ *α*. Uniserial.

Crisidia, M.-Edwards, Busk, Auctt.
Unicellaria (pars), Blainville.
Falcaria, Oken, Gray.
Tibiana, Lister (*nec* Blainville, Lamx.).
Unicrisia, d'Orb., Vine.

No species belonging to this section occurs in the Challenger collection.

§ *β*. Zoœcia disposed in a double series, opposite or alternate.

§§ *α*. Zoœcia opposite in pairs, from two to four (rarely six) in an internode.

Bicrisia, d'Orbigny.
Crisia (pars), Auctt.

(1) *Crisia biciliata*, Macgilliv. (Pl. I. figs. 1, 2).

Crisia biciliata, Macgilliv., Nat. Hist. Vict., Dec. iv. p. 37, pl. xxxix. fig. 2.

Character.—An opposite pair of perfect zoœcia in each internode, with a third intermediate aborted one between them, from which the succeeding pair or a branch arises. A pair of long, jointed spines articulated to the outer part of each zoœcium, excepting those bearing the secondary branches. Oœcia small, much elongated, pyriform, situated at the angle of a bifurcation. Zoœcia 0·07 mm. in diameter.

Habitat.—Station 135, Tristan da Cunha, 60 to 1100 fathoms, rock and shells; [Williamstown, Mapleston; Warrnambool, Watts].

As Mr. Macgillivray remarks (p. 38) "The aspect and general arrangement of the cells are the same as in *C. edwardsiana*, d'Orb. There are two cells in each internode, except in those from which the branches originate. The cells, as he observes, are not so long as those represented in M. d'Orbigny's figure of *C. edwardsiana*, and are wider superiorly, and the free part is not so long, and is much more abruptly curved forwards; the oœcial cell is smaller, more elongated, and each lateral cell supports usually two, but sometimes only one long-jointed spine."

Mr. Macgillivray further remarks that he is doubtful to what species my description and figures of *Crisia edwardsiana* (Brit. Mus. Cat., pt. iii. p. 5, pl. ii. figs. 5–8) refer, and I am compelled to say that subsequent examination of the specimens from which that description was chiefly drawn, some of which were from Tierra del Fuego, collected by Mr. Darwin, and others from New Zealand, procured by Dr. Sinclair, has left considerable doubt in my mind as to the identity of these two forms; the latter, it is highly probable, is distinct from the Patagonian *Crisia edwardsiana*, in which the zoœcia, as represented by M. d'Orbigny, are very long and erect, whilst in the New Zealand species they are short and curved forwards. There is also another form or variety closely approaching the New Zealand species, but in some measure intermediate between that and the South American one, which may turn out to be distinct from either, and to form an intermediate variety, characterised by a tendency to have two or more pairs of cells in some of the internodes, and less exactly opposite. All three, however, are furnished with only a single articulated spine, which arises close below the mouth, instead of low down the back as in *Crisia biciliata*. One character is observable in the New Zealand form which I have not noticed in the others, viz., that the dorsal aspect of the pair of zoœcia is entire, and faintly striated transversely.

§§ *b*. Zoœcia numerous (more than six) in each internode, alternate on the two sides. Oœcia irregularly disposed, often absent.

Crisia (pars), Auctt.

(2) *Crisia eburnea*, var. *laxa* (Pl. II. fig. 1).

Sertularia eburnea, Linné.
La Sertolara d'avorio, Cavolini, Sprengel.
Cellularia eburnea, Pallas, Bruguières.
Cellaria eburnea, Soland., Bosc, Lamarck, Johnst., Transact. Newc. Soc., vol. ii. p. 262, pl. xi. fig. 5.
Crisia eburnea, Lamx., M.-Edwards, Fleming, Johnst., Templeton, Blainville, Risso, Couch, Hincks, Norman, Alder, Hassall, Van Beneden, Rech. s. l'Anat. des Bryoz., Mém. Brux., t. xviii. p. 52, pl. vi. figs. 12–16; Busk, d'Orbigny, Pal. Franç., p. 598; Joliet, Arch. de Zool. Expér. et Gén., vol. vi., 1877.

Character.—Zoarium small, tufted. Zoœcia usually three to seven in each internode (rarely nine to eleven) loosely aggregated. Branches usually arising from the first or lowest zoœcium in an internode, sometimes from the second or third. Aperture circular, sometimes slightly pointed on one side. Œcia pyriform, surface even. Branches 0·15 mm., zoœcia about 0·07 mm. in diameter.

Habitat.—Station 149, D. and I., off Kerguelen Island, 28 to 105 fathoms, volcanic mud.

[Seas of Europe; Spitzbergen, Smitt; Madeira; Adriatic; Roscoff, Joliet.]

Except in its rather more loose mode of growth this form does not differ in any essential character from the common *Crisia eburnea*.

(3) *Crisia denticulata*, Lamarck, sp. (Pl. II. fig. 3).

Cellaria denticulata, Lamk.
Crisia luxata, Fleming, Blainville, Johnston (ed. 1), Couch.
Crisia denticulata, M.-Edw., Johnst., ed. 2, p. 284, pl. 1. figs. 5–6; Gray, Sars, d'Orb., Gosse, Alder, Busk, Hincks, Norman, Smitt, Krit. Fört. öfver Skand. Hafs-Bryoz., p. 117 (*nec* Floridan Bryoz.); Waters, Ann. and Mag. Nat. Hist., ser. 5, vol. iii. p. 269; Vine, Joliet.
Cellaria arctica, Sars (teste Smitt).

Character.—Zoarium 1 to 3 inches high, of straggling growth. Zoœcia almost straight, connate nearly throughout their entire length. Aperture elliptical, usually pointed on one side. Œcial cells truncate, often with three or more transverse annulations. Branches usually arising in an internode from or above the fourth cell (sometimes from the second in the lower parts of the zoarium). Branches 0·23 mm., zoœcia 0·07 mm. wide.

Habitat.—Off St. Paul's Rocks, shallow water. Station 186, lat. 10° 30′ S., long. 142° 18′ E., 8 fathoms, coral mud. Off Inaccessible Island, Tristan da Cunha, 60 to 90 fathoms.

[Coasts of Britain and Ireland; Norway; Spitzbergen? Grand Manan? Stimps.; Bay of Naples; Roscoff.]

Var. *α. gracilis* (Pl. I. fig. 4).

Character.—Closely resembles *Crisia denticulata* but of far slenderer habit, rarely if ever presenting any longitudinal interspaces between the series of zoœcia; branches not more than 0·2 mm. wide; zoœcia about 0·06 in diameter.

Habitat.—Off Zebu, Philippine Islands.

Var. *β. patagonica*, d'Orbigny (?)

Crisia patagonica, d'Orb., Voy. Amér. Mérid., Polyp., p. 7, pl. i. figs. 1–3.

"Cells from nine to nineteen, straight, very distinct; branches arising from second or third cell; sometimes two from an internode, when the second arises from the sixth cell. Joints black." Diameter of branches about 0·23 mm., and of zoœcia 0·08 mm.

Habitat.—Station 36, off Bermudas, 30 fathoms, coral.

[Patagonia.]

(4) *Crisia elongata*, M.-Edw. (Pl. I. fig. 5).

Crisia elongata (?), M.-Edwards, Réch. sur les Crisies, p. 10, pl. vii. fig. 2; Busk, Brit. Mus. Cat., pt. iii. p. 3, pl. iv. figs. 5–6; Waters.

Character.—Zoarium composed of long straight branches. Zoœcia, twelve to twenty-one or more in each internode; often much produced and curved forwards. Aperture circular, even; branches arising from the fifth to the seventh zoœcium. Oœcial cells unknown. Surface finely granular. Branches 0·3 mm., zoœcia 0·07 mm. wide.

Habitat.—Station 176, lat. 18° 30′ S., long. 173° 52′ E., 1450 fathoms, Globigerina ooze.

[Red Sea or Mediterranean? M.-Edw.; Algoa Bay.]

Whether the specimen (the only one in the Challenger collection) here described and figured really be the form described by M. Milne-Edwards I am by no means now convinced, but it is the same as that to which I have given the same appellation in the British Museum Catalogue. One reason for the doubt is that M. Milne-Edwards describes his *Crisia elongata* as narrower than *Crisia denticulata*, while that I have to name is certainly quite as wide, if not wider, than the usual form of *Crisia denticulata*.

(5) *Crisia acuminata*, n. sp. (Pl. III. fig. 1).

Character.—Zoarium 1 to 2 inches high, composed of long, straggling, flexuose branches dividing once or twice dichotomously and terminating in two short bifurcations. One of the terminal zoœcia (usually the penultimate), is often produced into a long,

acute, tapering spine. The internodes comprise from seven to eleven zoœcia, usually seven or nine, and the branches always arise from the second. Zoœcia about half connate, produced above and curved abruptly forwards; aperture circular, even, border thin. Surface sparsely punctate; dorsal aspect finely striated, with a row of punctures down each interspace. Branches convex before and behind, and without any intermediate longitudinal space. Joints white or pale brown. Oœcial cells? Branches 0·2 to 0·25 mm., zoœcia 0·1 mm. wide.

Habitat.—Station 320, lat. 37° 17′ S., long. 53° 52′ W., 600 fathoms, green sand.

Somewhat like *Crisia denticulata*, but differing in the general habit which is characterised by the very long, straggling, wavy, or flexuose, sparingly forked branches, terminating in two or three short forks. Many of the ultimate segments exhibit a longer or shorter, acutely tapering, pointed spine, formed of a metamorphosed zoœcium. A similar disposition may be occasionally seen in a species of *Crisia*, to which I have given the name of *Crisia sinclairensis* (Brit. Mus. Cat., pt. iii. p. 6, pl. iv. figs. 7–11), but in this species the spinous process thus formed is much more obtuse, and there are other differences which prevent their being considered the same.

(6) *Crisia acropora*, Busk.

Crisia acropora, Bk., Voy. of Rattles., vol. i. p. 351; Brit. Mus. Cat., pt. iii. p. 6, pl. v. figs. 3–4; Macgilliv., *loc. cit.*, Dec. iv. p. 38, pl. xxxix. fig. 3.

Character.—Cells nine to thirteen in each internode; a conical tooth (sometimes bifid) behind the orifice. Zoœcia slightly compressed; surface closely punctured, brilliant, sometimes porcellanous. Branches arising from the second to the fourth zoœcium. Oœcial cells large, pyriform, frequently annulated. Branches 0·25 mm., and zoœcia about 0·06 mm. wide.

Habitat.—Station 161, off Port Philip, 33 fathoms, sand.

[Bass Strait, R.; Williamstown and Queenscliff, Macgilliv.]

In this species the radical tubes are much curled, always arising from the bottom of the lowest cell in an internode, behind.

(7) *Crisia holdsworthii*, Busk (Pl. III. fig. 2, oœcium).

Crisia holdsworthii, Busk, Brit. Mus. Cat., pt. iii. p. 7, pl. vi.B fig. 2.

Character.—Zoœcia nine to eleven in each internode, connate throughout, with a short, tubular, cylindrical prolongation projecting directly forwards; walls very delicate, sparsely punctured; branches arising usually from the third, but in the lower internodes

not unfrequently from the second cell. Oœcial cell infundibuliform, rounded at the top. Branches 0·2 mm., and zoœcia 0·08 mm. wide.

Habitat.—Off Marion Island, 50 to 75 fathoms; off Prince Edward Island, 80 to 150 fathoms.

[Ceylon, Holdsworth.]

Habit very delicate and slender. May be allied to *Crisia tenuis*, Macgilliv. (*loc. cit.*, p. 39, pl. xxxix. fig. 5), in which, however, the zoœcia appear to be less closely connate. In the specimens brought by Mr. Holdsworth from Ceylon there were no oœcia; on which account I have given a figure of that organ from the Challenger collection.

(8) *Crisia conferta*, Busk (Pl. II. fig. 5).

Crisia conferta, Bk., Brit. Mus. Cat., pt. iii. p. 7, pl. vi.A fig. 5.

Character.—Zoarium tufted, composedof short, thick, curved branches radiating as it were from a short central stem. Zoœcia thirteen to twenty-one in an internode; nearly the upper half free, cylindrical, curved abruptly forwards; orifice orbicular or subelliptical, of the same diameter as the tube; branches one to four from each internode, not opposite. Oœcial cells closely adnate, median or axilliary; usually broadly truncate. Branches 0·35 mm., and zoœcia 0·07 mm. wide.

Habitat.—Off St. Vincent, Cape de Verde Islands, depth 10 fathoms. Station 163A, off Twofold Bay, 150 fathoms.

[Cape de Verde Islands, H.M.S. "Herald."]

A well-marked species, growing usually in dense tufts, and peculiar for the number of branches springing from an internode. The curved free portion of the cell is not, as is most usually the case, a mere production of the peristome marked with annular lines of growth, since the wall of that part is punctured like the rest of the zoœcium.

(9) *Crisia cylindrica*, n. sp. (Pl. II. figs. 2, 4).

Character.—Zoarium about $\frac{1}{2}$ an inch high, furcately branched; ten to thirty zoœcia in an internode; usually two branches given off from the longer segments, the lower from about the seventh zoœcium, and the upper near the summit of the internode. Zoœcia about half immersed, the upper part curved forwards, exceedingly delicate and thin-walled, without puncta; orifice circular, margin even. Branches perfectly cylindrical, with an even shiny surface, distinctly punctate; dorsal aspect obliquely striated, but quite even. Oœcial cells pyriform, usually axillary, with a wide tubular orifice. Diameter of branches about 0·15 mm., and of zoœcia 0·06 to 0·08 mm.

Habitat.—Off Nightingale Island, Tristan da Cunha, 100 to 150 fathoms.

A beautifully delicate form, distinguishable by its very slender habit and the perfectly cylindrical aspect of the branches, with the projecting cylindrical zoœcia, the projecting portion wholly oral. Its nearest ally would be *Crisia holdsworthii*.

Division II.—INARTICULATA.

Centrifuginés empâtés à cellules non operculées, d'Orb., Palæont. Franç., p. 605 (pars).
Inarticulatæ seu affixæ, Bk., Crag Polyzoa, p. 93.
Incrustata, d'Orbigny, Smitt.

Character.—Zoarium continuous, not divided into distinct internodes, fixed by a contracted calcareous base, either erect and free, or immediately adnate upon foreign bodies, and recumbent in whole or in part.

Subdivision A. ERECTA.

Family II. Idmoneidæ, Busk.

Tubigeridæ (pars), d'Orbigny, *loc. cit.*, p. 698.
Tubuliporidæ (pars), Johnst., Smitt, Hincks.
Les Tubuliporiens (pars), Milne-Edwards.
Idmoneidæ, Bk., Crag Polyzoa, p. 94; Brit. Mus. Cat., pt. iii. p. 10; Macgilliv.
Idmoneadæ, Bk., Engl. Cyclopedia, art. Polyzoa.
Horneridæ, Hincks.

Character.—Zoarium usually erect and rarely adnate, simple or branched; branches cylindrical, subcylindrical, or triangular, free or anastomosing.

The Family here contains the following genera :—

1. *Idmonea*, Lamx.

§ *a*. The zoœcia all disposed in alternate series on each side of the front of the branches; the innermost the longest.

(1) *Idmonea atlantica*, E. Forbes.
(2) *Idmonea radians*, Lamk.
(3) *Idmonea marionensis*, Busk.
(4) *Idmonea australis*, Macgilliv. (Pl. III. fig. 3).
(5) *Idmonea eboracensis*, n. sp. (Pl. III. fig. 4).

§ *β*. The outermost zoœcia in the lateral series the longest; isolated zoœcia opening in the space on the front between the lateral series.

(6) *Idmonea milneana*, d'Orb.
(7) *Idmonea irregularis*, Meneghini.
(8) *Idmonea fissurata*, n. sp. (Pl. III. fig. 5).

2. *Hornera*, Lamx.

§ *α*. Zoarium branched, branches free or rarely inosculating.

§§ *a*. Oœcia dorsal; anterior surface of branches reticulato-fibrillate.

(1) *Hornera frondiculata*, Lamx.
(2) *Hornera lichenoides*, Linn.

§§ *b*. Oœcia anterior, either wholly or in part; surface in front not fibrillated or sulcate.

(3) *Hornera violacea*, Sars.

§ *β*. Zoarium foliaceous, branches connected by transverse tubules.

(4) *Hornera foliacea*, Macgilliv.

3. *Pustulopora*, Blainv.

(1) *Pustulopora proboscidea* (Pl. IV. fig. 1).
(2) *Pustulopora proboscidioides*, (Pl. IV. fig. 4).
(3) *Pustulopora deflexa*, Smitt (Pl. IV. fig. 3).
(4) *Pustulopora regularis*, Macgilliv. (Pl. IV. fig. 2).

1. *Idmonea*, Lamouroux.

Idmonea, Lamx., Exp. Méth., p. 80; Defrance, Blainville, M.-Edwards, Johnst., Lonsdale, Reuss, Michelin, Hagenow, d'Orb, 1852 (pars); Busk, Van Beneden, Hincks, Smitt (subgenus), &c.
Crisia (pars), d'Orbigny, Stoliczka.
Retepora (pars), Goldfuss, Lamk.
Diastopora (pars) Michelin.
Tubulipora (pars), Lamk., Smitt.
Crisina (pars), d'Orbigny, Smitt.

Character.—Zoarium erect, free or very partially adnate, branched dichotomously or irregularly; springing from a single tubular cell, having a constricted, basal, discoid expansion. Branches free or anastomosing; orifices of zoœcia disposed in parallel or subparallel, transverse or oblique, usually alternate series on the sides of the front of the

branches, which are usually flattened behind, and either angular or rounded on the anterior aspect.

§ *a*. The zoœcia all disposed in alternate series on each side of the front of the branches; the innermost the longest.

(1) *Idmonea atlantica*, E. Forbes.

Idmonea radians, Van Beneden, Bryoz. de la Mer du Nord, Bull. Brux., xvi. pt. ii. p. 646, pl. i. figs. 4, 6.

? *Idmonea coronopus*, Defrance, Dict. d. Sci. Nat., vol. xxii. p. 565; d'Orbigny, Milne-Edwards, Réch. sur les Crisies, p. 23, pl. x. fig. 3.

Idmonea atlantica, E. Forbes, MSS., Smitt, Johnst., Gray, Sars, Busk, Ann. and Mag. Nat. Hist., ser. 2, vol. xviii. p. 34, pl. i. figs. 6*a–e*; Quart. Journ. Micr. Sci., vol. vi. p. 128, pl. xviii. fig. 5; Rep. Brit. Assoc., 1859 (Trans. Sect.) p. 146; (var. *tenuis*) Brit. Mus. Cat., pt. iii. p. 11, pl. ix.; Smitt, Florid. Bryoz., p. 6, pl. ii. figs. 7, 8; Hincks, Waters, &c.

? *Idmonea angustata*, d'Orb., Palæont. Franç., p. 731.

Character.—Zoarium irregularly branched and usually more or less in one plane; branches triangular, one to four or five cells in each series, the innermost the longest; dorsal surface very minutely punctate; peristome entire, even. Oœcium anterior, subpyriform.

Habitat.—Off Nightingale Island, 100 to 150 fathoms. Station 149E, off Cape Maclear, Kerguelen, 30 fathoms. Simon's Bay, Cape of Good Hope, 18 fathoms.

[Arctic Seas; coast of Norway and Finmark; Shetland; var. *tenuis*, North Atlantic; Gulf of Florida, Smitt; Madeira (?); Bay of Naples; fossil in Italian Miocene and Canadian Post Pliocene (?).]

(2) *Idmonea radians*, Lamarck (sp.).

Retepora radians, Lamk., d'Orbigny.

Idmonea radians, Busk., Brit. Mus. Cat., pt. iii. p. 11, pl. vii. figs. 1–4; Macgilliv., Nat. Hist. Vict., Dec. vii. p. 30, pl. lxviii. fig. 3; Waters; Haswell, Proc. Linn. Soc. N. S. Wales, vol. iv. p. 350, vol. v. p. 35.

? *Hornera radiata*, Blainv., Man. d'Actin., p. 419.

Idmonée rayonnante, M.-Edw., *loc. cit.*, p. 25, pl. xii. fig. 4.

Character.—Zoarium usually procumbent, radiate in a more or less regular circle, stipitate, sometimes suberect, with elongated, straight, subparallel bifurcating branches. Branches keeled in front, rounded behind. Dorsal aspect longitudinally sulcate, with a series of long perforations or alveoli along the sulci; the sides and front pitted, sometimes almost reticulate. Zoœcia produced, gently curving forwards, somewhat tapering, often with a bilabiate orifice, about 0·06 mm. Branches 0·3 mm., series about 0·4 mm. apart. Usually only one or two zoœcia on the sides of the front, alternate, when more than one the inner one the longer. Oœcial chambers subglobular on the anterior aspect, close below, but not at a bifurcation; surface coarsely pitted or foveolate.

Habitat.—Station 172, off Tongatabu, 18 fathoms, coral mud. Off Honolulu, 20 to 40 fathoms.

[Australian Seas *ubique*, New Zealand, &c.]

This species appears to occur under two rather distinct forms. In one (the typical) it constitutes a beautiful circular expansion, about one inch or more in diameter, composed of short bifurcating branches radiating from a central short stem (*vide* Brit. Mus. Cat., pt. iii. pl. vii. fig. 1*a*), or a more straggling growth in which the branches, though still springing from a more or less excentric point, are much longer, forming elongated forks (*loc. cit.*, fig. 1*b*), constituting a variety to which the term *stricta* might be applied. Very fine specimens of this form occur in the Challenger collection, from Honolulu, whilst a beautiful specimen of the radiate type was procured at Station 172, off Nukalofa, Tongatabu.

In all the Challenger specimens there is rarely more than one zoœcium to represent the lateral series, but in others there are occasionally as many as four (*vide* Brit. Mus. Cat., pt. iii. pl. vii. fig. 4), as described by Mr. Macgillivray. The great peculiarity of the species, however, is seen in the coarsely pitted or foveolate surface on the sides of the branches, and the series of large pores or pits along the dorsal sulci; the oœcial chambers also have peculiar sculpture.

(3) *Idmonea marionensis*, Busk.

Idmonea marionensis, Busk, Brit. Mus. Cat., pt. iii. p. 13, pl. xiii. figs. 3, 5; pl. vii. figs. 7, 8 (young state); Waters, Haswell.

? *Crisina hochstetteriana*, Stoliczka, "Novara" Exp., Geol. Theil, Bd. i. p. 113, Taf. xviii. fig. 3; Smitt, Florid. Bryoz., p. 6, pl. ii. figs. 11–13.

Character.—Zoarium slender, elongate, very sparingly branched; stem and branches cylindrical or subcylindrical. Zoœcia two to four in each series (most usually two) about 0·15 to 0·20 mm., series wide apart, 0·7 to 0·8 mm., when entire the innermost the longest. Surface finely but sparsely punctured; dorsal surface convex, with a fine longitudinal striation.

Habitat.—Off Marion Islands, 50 to 75 fathoms; off Prince Edward Island, 80 to 150 fathoms. Station 147, lat. 46° 16′ S., long. 48° 27′ E., 1600 fathoms, Diatom ooze. Station 151, off Heard Island, 75 fathoms, volcanic mud. Station 320, lat. 37° 17′ S., long. 53° 52′ W., 600 fathoms, green sand.

[? Auckland, New Zealand, fossil, Stoliczka; Bay of Naples and Marion Island, Waters; Queensland, Haswell.]

As I have remarked in Brit. Mus. Cat., this species seems to mark a transition between *Pustulopora* and *Idmonea*. The cells, however, are always disposed in rows or series on each side of the anterior aspect of the branch, and are for the most part deeply immersed;

the exserted portion being of a very thin and delicate texture rarely shows the orifice in a perfect condition. It may perhaps be identical with M. d'Orbigny's *Idmonea canariensis* (Palæont. Franç., p. 732); but as neither figure nor sufficient description of that species are given, and it is merely stated to be "slender as a thread and almost round, with very few cells," it is impossible to be certain.

(4) *Idmonea australis*, Macgillivray (Pl. III. fig. 3).

Idmonea australis, Macgilliv., *loc. cit.*, Dec. vii. p. 30, pl. lxviii. fig. 2.

Character.—Zoarium of small size ($\frac{1}{2}$ to $\frac{3}{4}$ inch), irregularly branched once, each short branch terminating in a single fork; branches contorted and sometimes twisted; four to six zoœcia in each series, the inner the longest; no intermediate longitudinal space in front between the series. Zoœcia very slender (0·12 mm.), connate below, but when perfect much produced or free for one-half or two-thirds of their length, slightly tapering, some nearly straight and ascending obliquely, but towards the upper part of the branches curved forwards, not flattened in front; series 0·7 to 1·0 mm. apart. Branches compressed, rounded both in front and behind, about 0·6 mm. wide, everywhere minutely dotted, up to the border of the aperture; dorsal surface very finely striated longitudinally, intermediate spaces with very minute dots in irregular longitudinal series.

Habitat.—Station 163B, off Port Jackson, 30 to 35 fathoms, rock. Off Marion Island, 50 to 75 fathoms.

[Port Philip Heads, 10 to 15 fathoms, Macgilliv.]

A very distinct and well-marked species, easily recognisable by the compressed form of the branches, which on section are oval, as well as by the extremely fine punctation, or rather white dotting of the surface, and the fine or close longitudinal striation of the dorsal aspect. It appears to vary very much in the length of the exserted portion of the zoœcia, which, in the specimens from Marion Island, forms more than half the length of the cell (Pl. III. fig. 3). The exserted part is very slightly tapering and no part of it appears to be peristomal, as the wall exhibits the minute punctation quite up to the orifice, and there is very rarely any appearance of annular lines of growth. None of the specimens present any oœcial chamber.

Mr. Macgillivray suggests that this species may prove to be a form of *Idmonea atlantica*, but for this view I can see no grounds whatever.

(5) *Idmonea eboracensis*, n. sp. (Pl. III. fig. 4).

Character.—Zoarium very small, not more than $\frac{1}{4}$ inch high; branches very short and irregular, once furcate, much compressed, 0·6 mm. wide; dorsal aspect rounded, longitudinally striated but not grooved. Striæ (fig. 4*c*), about 0·01 mm. apart, a single irregular

row of dots down each interspace. Zoœcia (0·1 mm.), usually four in each series, of uniform length, except the innermost, which is the longest; series 0·4 to 0·5 mm. apart.

Habitat.—Station 186, off Cape York, 8 fathoms, coral mud.

The collection affords only a single such specimen, but apparently mature, inasmuch as two of the branches are widely dilated at the second bifurcation into an elongated, deeply immersed oœcial chamber.

§ *β.* (subgenus *Tervia*).—The outermost zoœcium in each lateral series the longest; scattered zoœcia opening irregularly in the space between the lateral series.

Tervia, Jullien, Bull. Soc. Zool. de France, vol. vii. p. 500, 1882.

(6) *Idmonea milneana*, d'Orbigny.

Idmonea milneana, d'Orb., Voy. Amér. Mérid., "Polypiers" p. 20, pl. ix. figs. 17–21; Palæont. Franç., p. 732; Smitt, Florid. Bryoz., p. 8, pl. iii. figs. 14–17; Macgilliv., *loc. cit.*, Dec. vii. p. 29, pl. lxviii. fig. 1; Busk, Brit. Mus. Cat., pt. iii. p. 12, pl. xi.; Waters, Haswell, Ridley.

? *Idmonea transversa*, Milne-Edw., *loc. cit.*, p. 26, pl. ix. fig. 3.

Character.—Zoarium spreading from a central peduncle, branching dichotomously. Branches depressed, broad, flattened or slightly rounded behind, 0·8 to 1·5 mm. wide; surface thickly punctate; on dorsal aspect irregularly striated longitudinally, and, except in the younger part, transversely wrinkled. Zoœcia about 0·2 mm. in diameter, usually four or more in a series, the outer the longer; a few intermediate zoœcia opening in the space in front between the lateral series; series 0·6 to 1 mm. apart. Oœcial chamber ?

Habitat.—Station 75, lat. 38° 38′ N., long. 28° 28′ 30″ W., 450 fathoms, volcanic mud. Station 151, off Heard Island, 75 fathoms, volcanic mud. Off Prince Edward Island, 80 to 150 fathoms.

[Port Philip Heads, 10 to 15 fathoms, Macgilliv.; Falkland Islands, d'Orbigny; coast of Tierra del Fuego, and Patagonia, 30 fathoms; Chonos Archipelago, Darwin; Port Jackson and Queensland, Haswell.]

The cells, as Mr. Macgillivray observes, are usually four in series, the inner the least prominent, the others gradually increasing in length to the outer, which projects very much. They are united side to side throughout almost their whole length, so as to form regular walls, rising up and projecting far beyond the sides of the branches. As in several other species of *Idmonea* numerous radical tubes are given off from the back of the branches by which the growth is attached. The anterior median single zoœcia are few in number and usually nearly level with the surface. *Idmonea milneana* belongs to the group for which M. Jullien has proposed the name of *Tervia*, characterised by the

possession of an intermediate or azygos set of zoœcia on the front, and, it may be added, by the circumstance that the outermost zoœcium in the lateral series is the longest.

(7) *Idmonea irregularis*, Meneghini.

Idmonea irregularis, Meneghini, Mem. sui Polypi della Famiglia Tubuliporiani, p. 12 (*teste* Heller); Heller, Adriat., p. 121; Busk, Brit. Mus. Cat., pt. iii. p. 13, pl. xii.; Waters, Haswell.
? *Tervia folini*, Jullien, Bull. Soc. Zool. de France, vol. vii. p. 501, pl. xiii. figs. 8-9, 1882.

Character.—Zoarium composed of irregularly dichotomous, slender, rounded branches, 0·5 to 0·6 mm. wide. Zoœcia four to six in each lateral series, and the intermediate space in front occupied by numerous others irregularly scattered; series 0·6 to 0·8 mm. apart. Diameter of zoœcia 0·1 to 0·15 mm.; surface uniformly and thickly punctate; dorsum with longitudinal striæ wide apart. Oœcial chamber ?

Habitat.—Station 75, lat. 38° 38′ N., long. 28° 28′ 30″ W., 450 fathoms, volcanic mud.

[Adriatic, Meneghini, Heller; Mediterranean, H.M.S. "Porcupine"; Bay of Biscay, Jullien; Bay of Naples, Waters; Queensland, Haswell.]

(8) *Idmonea fissurata*, n. sp. (Pl. III. fig. 5).

Character.—Zoarium procumbent, composed of branches radiating irregularly from a central peduncle, dividing about twice dichotomously and appearing strongly serrated on the borders; branches 0·7 to 1 mm. wide. Zoœcia 0·15 to 0·2 mm. in diameter, with an elliptical aperture, closely adnate, the outermost the longest; a few isolated median zoœcia whose apertures are usually level with the surface. Lateral series 0·9 to 1·1 mm. apart. Surface of branches in front and behind deeply and irregularly sulcate and pitted.

Habitat.—Station 320, lat. 37° 17′ S., long. 53° 52′ W., 600 fathoms, green sand.

This species is at once recognisable by the peculiar fissured aspect of the surface, both in front and behind, and the numerous irregular pits with which it is studded. Its habit in some specimens is something like that of *Idmonea radians*, but much stronger. Like the others of the group to which it belongs, the branches appear serrated on each side.

2. *Hornera*, Lamouroux.

Hornera, Lamx., Expos., p. 41 (1821); Milne-Edwards (pars), Reuss (pars), Blainville (pars), Defrance, Michelin, Hagenow, d'Orbigny, Smitt, Hincks, Busk, Sars, &c.
Millepora (pars), Linné, Pallas, Esper, Solander.
Retepora (pars), Lamarck, Goldfuss.
Syphodictyum (pars), Lonsdale.

Character.—Zoarium ramose or foliaceous; zoœcia opening only on one side; oœcia dorsal or anterior.

§ *a. Ramosa.*—Zoarium branched, branches free or rarely inosculating, cylindrical or subcompressed.

§§ *a.* Oœcia dorsal; anterior surface of branches reticulato-fibrillate.

(1) *Hornera frondiculata*, Lamouroux.

Hornera frondiculata, Lamx., Exp., p. 41, pl. lxxiv. figs. 7–9; Milne-Edwards, *loc. cit.*, p. 17, pl. ix. figs. 1–1*c*.; Blainville, Man. d'Actin., p. 419; Heller, Adriat., p. 124; Busk, Brit. Mus. Cat., pt. iii. p. 17, pl. xx. figs. 1, 2, 3, 6; Manzoni, Waters.
Millepora tubipora, Ell. and Soll, p. 139, pl. xxxi. fig. 1.
Millepora lichenoides, Linné, Pallas, Esper.
? *Hornera affinis*, M.-Edw., *loc. cit.*, p. 9, pl. x. fig. 1.
? *Hornera andegavensis*, Mich., Icon. Zooph., p. 318, pl. lxvi. fig. 8.
Hornera serrata et tubulosa (?), Meneghini, *loc. cit.*, p. 10.

Character.—Branches tapering, ramifying more or less in one plane, cylindrical or subcompressed; anterior surface strongly fibro-reticulate, divided into rhomboidal spaces in which are situated the orifices of the zoœcia, surrounded with numerous small pores. Orifice exserted, usually bifid; dorsal surface coarsely reticulate, granular or nearly smooth, with small elongated pores in the sulci. Oœcia oblong, carinate, ribbed; aperture tubular, superior. Diameter of branches about 0·6 mm., and of orifice 0·08 mm.

Habitat.—Porto Praya, St. Iago, Cape de Verde, 100 to 120 fathoms.

[Mediterranean, Adriatic (very abundant). Fossil in the Crag and Upper Tertiaries of Sicily, &c.]

(2) *Hornera lichenoides*, Linné (sp.).

Corallium, Pontoppidan, Norg. Natuurl., vol. i. p. 258, pl. xiv. figs. D.E.
Millepora lichenoides, Linné, Müller, Prodr., p. 252, No. 3046; Ström, Act. Hafn., vol. xii. p. 309, pl. iii. fig. 12; Fabricius, Zool. Samml. (*teste* Smitt), and Fauna Grœnl., p. 432 (*nec* Pallas).
Hornera frondiculata, Sars, Reise Lof. og Finm., Nyt Magazin f. Nat.-Vid., t. vi. p. 146; Busk, Ann. and Mag. Nat. Hist., ser. 2, vol. xviii. p. 34, pl. i. fig. 7*a*.
Hornera borealis, Busk, Crag Polyzoa, pp. 95–103; Alder, New British Polyzoa, Quart. Journ. Micr. Sci., N.S., vol. iv. p. 108, pl. v. figs. 1–6.
Hornera lichenoides, Smitt, Kritisk Förteckn., pp. 404, 469, pl. vi. fig. 10, pl. vii. figs. 1–14; Busk, Brit. Mus. Cat., pt. iii. p. 17. pl. xviii. figs. 5–6; Hincks, Brit. Mar. Polyz., p. 468, pl. lxvii. figs. 1–5.

Character.—Zoarium rising from a rather thick furrowed base, branched irregularly; branches dichotomous, crowded and straggling, often spreading out in a flabelliform

manner. Anterior surface obscurely fibro-reticulate, sparsely furnished with subtubular pores. Zoœcia on the front of the branches, immersed or very slightly prominent, those of the outer sides of the branches tubular, slightly expanded towards the orifice, which is more or less elliptical, with an entire border often much produced on one side; dorsal surface finely sulcate with minute pores in the sulci. Œcia dorsal, subglobular or gibbous, the surface reticulate or coarsely punctured. Aperture tubular, lateral (from which a very slender rib stretches across to the opposite side, Hincks). Diameter of branches 0·5 to 0·6 mm., and of orifice about 0·1 mm.

Habitat.—Station 320, lat. 37° 17′ S., long. 53° 52′ W., 600 fathoms, green sand.

[Arctic Seas, Lovén; coasts of Scandinavia, Pantoppidan, Sars, Macandrew; Shetland, Barlee; Hebrides, Norman; Nova Zembla; Greenland, Lütken; St. Georges Banks, Smitt and Harger.]

§§ *b.* Œcia anterior, either wholly or in part; dorsal surface granular or finely striate.

(3) *Hornera violacea*, Sars.

Hornera violacea (*forma violacea*), Smitt, *loc. cit.*, p. 404, Tab. vi. fig. 6–9; Sars, Geol. og zool. Jagtt. Reise Trondhj., 1862, Nyt Mag. Nat.-Vid., vol. xii. p. 282; Busk, Brit. Mus. Cat., pt. iii. p. 18, pl. xviii. figs. 1–4; Norman, Shetl. Dredg., Rep. Brit. Assoc., 1867, p. 310; Hincks, Brit. Mar. Polyz., i. p. 469, pl. lxvii. figs. 6–8, pl. lxii. figs. 2, 3.

Pustulopora orcadensis, Bk., Quart. Journ. Micr. Sci., 1860, vol. viii. p. 214, pl. xxxix. figs. 1, 2.

Character.—Zoarium more or less of a violet colour, branched, straggling; branches short, truncate, irregularly dichotomous. Zoœcia very irregularly disposed, sometimes crowded into small fasciculi, usually elongated; surface punctate (not reticulate); dorsal surface granular, or very finely striated with minute pores, often a rib-like elevation down the centre of the branch. Œcia elongated, situated in the axils of the branches, usually more towards the dorsal aspect; surface smooth, finely punctate, with a thin median costa; orifice bilabiate near the top. Diameter of branches 0·4 to 0·7 mm., and of orifice 0·12 mm.

Habitat.—Station 151, off Heard Island, 75 fathoms, volcanic mud.

[Arctic and Northern Seas, generally distributed; Shetland.]

§ *β. fenestrata* (subgenus *Retihornera*).—Branches sub-parallel, connected by transverse tubules, so as to form an expanded frond with quadrangular fenestræ.

Retihornera (pars), Kirchenpauer, Cat. iv. of the Museum Godeffroy, 1869; Busk, Brit. Mus. Cat., pt. iii. p. 19.

(4) *Hornera foliacea*, Macgillivray.

Hornera foliacea, Macgilliv., Proc. Roy. Soc. Vict., vol. ix., p. 142, 1868.
Retihornera foliacea, Busk, Brit. Mus. Cat., pt. iii., p. 19, pl. xiii. figs. 1, 2, and pl. xix.; Haswell.
? *Retihornera dentata*, ? *Retihornera plicata*, Kirchenpauer.

Character.—Zoarium expanded, foliaceous, irregularly plicate or convoluted, rising from a short stem with a discoid base; main branches straight, parallel, connected by numerous transverse celliferous branches or trabeculæ, forming quadrangular fenestræ of pretty uniform size, from 0·7 to 2 mm. in length by 0·3 to 0·4 mm. wide, or about the width of the branches. Zoœcia in the young state exserted, with a usually bifid or toothed orifice, about 0·05 mm. in diameter. In the older condition more immersed, with an irregularly bifid or toothed, thickened, somewhat expanded orifice. Anterior surface fibro-reticulate, obscurely punctate and uneven; posterior sulcate, granular, obscurely punctured or pitted. Oœcia subglobose, dorsal; usually three zoœcia in the width of a branch, and one in a trabecula.

Habitat.—Station 161, off Port Philip, 33 fathoms, sand. Station 163B, off Port Jackson, 35 to 38 fathoms, rock.

[South Australia, Gould, Macgillivray; Queensland, Haswell.]

Although at one time inclined to regard the fenestrate form of *Hornera* as entitled to the rank of a distinct genus or subgenus, I no longer regard it as forming more than a subgenus, as in all essential characters it perfectly agrees with such forms as *Hornera lichenoides*, *Hornera frondiculata*, and *Hornera cæspitosa*, mihi., differing as do those species from *Hornera violacea* in having the anterior aspect fibro-reticulate, and the oœcia dorsal. In the Brit. Mus. Cat., pt. iii., p. 19, I have described *Hornera foliacea* as being furnished with delicate spiculæ projecting from the sides of the fenestræ, but it is highly probable that these are merely the spiculæ of some parasitic encrusting Sponge; in all other respects the form brought by Mr. Gould from South Australia in my collection, from which the account in the Brit. Mus. Cat. was drawn up, exactly agrees with the specimens in the Challenger collection, which again are undoubtedly the *Hornera foliacea* of Mr. Macgillivray. In one of the specimens is a shallow, circular, cup-shaped depression on the dorsal aspect, doubtless the remnant of an oœcium, but these organs would appear to be very rare.

3. *Pustulopora*, Blainville.

Pustulopora, Blainville (text), Man. d'Actin., p. 418, 1834; Milne-Edwards, Hagenow (*nec* Geinitz), Reuss, Michelin (?), Grube, Meneghini; Busk, Brit. Mus. Cat., pt. iii. p. 20, &c.; Macgilliv., Proc. R. Soc. Vict., December 1880, p. 6.
Pustulipora, Blainv. (index), Johnston, Gray, Sars, Joliet.
Tubulipora (pars), Couch.
Entalophora (pars), d'Orbigny (*nec* Lamouroux), Hincks, Brit. Mar. Polyz., p. 455; Smitt, Florid. Bryoz., vol. i. p. 11; Stoliczka, Waters, &c.

Character.—Zoarium erect, simple or branched, cylindrical; branches irregular, composed of tubular zoœcia partially or wholly connate or immersed; opening on all sides of the branch, and disposed quincuncially or irregularly, sometimes in more or less annular or subspiral order.

Although most recent writers, including such high authorities as Professor Smitt and Mr. Hincks, have adopted the name *Entalophora* for the genus here intended, I am inclined, with the greatest deference, to prefer M. de Blainville's and M. Milne-Edwards' name, for the reason that the species named *Entalophora* by Lamouroux appears to me to differ in at least one most important respect, it may be said, from all the other known Cyclostomata, and most certainly from all with which I am acquainted, either recent or fossil, viz., in the appendages, as he terms them, being trumpet-shaped, or gradually increasing in diameter as they increase in length. Whether this arises from an error of observation on the part of Lamouroux or of his draughtsman, or is the true condition, may perhaps admit of doubt; with the exception of M. Michelin (Iconog., pl. lvi. fig. 4), whose figure very strongly resembles that of Lamouroux, no one seems to have recorded any other form with trumpet-shaped tubes, and as even his figure does not represent them as having that form, I am much inclined to assume that Lamouroux's specimen is unique in that respect, and if correctly figured and described, that it must on that account alone be referred to a distinct generic type from all other known Pustuloporidæ, and in fact, as above observed, from all other Cyclostomata. (May it not be a coralline?).

On the other hand, M. de Blainville's definition of *Pustulopora*, as distinguished from Lamouroux's *Entalophora*, is so clear and precise, and his genus has met with the acceptance of M. Milne-Edwards, Hagenow, Reuss, and numerous others, and in fact may be said, until quite recently, to have been in full possession of the field, that I feel no hesitation in retaining it for all forms with cylindrical tubes of the same diameter throughout; and in relegating those forms, if there really be any, with trumpet-shaped tubes, to at least a distinct genus.

With respect to the spelling of the name there can be no doubt that *Pustulopora* is the correct way, *Pustulipora* being apparently merely a printer's error in the index to the Manuel d'Actinologie. In the text (*loc. cit.*) M. de Blainville has it *Pustulopora*. Mr. Macgillivray has passed over a similar misprint (*loc. cit.*) the name being spelled *Pustulopera* in the text and *Pustulopora* in the description of the plates.

(1) *Pustulopora proboscidea*, Milne-Edwards (Pl. IV. fig. 1).

Pustulopora proboscidea, M.-Edw., Sur les Crisies, p. 27, pl. xii. fig. 2; Heller, Adriat., p. 125; Grube, Die Insel Lussin, p. 68; Busk, Brit. Mus. Cat., pt. iii. p. 21 (*nec* pl. xviii.A); Haswell.

Pustulipora proboscidea, Johnst., p. 279, pl. xlviii. fig. 4; Gray.

Entalophora proboscidea, Waters, Bryoz. of the Bay of Naples, Ann. and Mag. Nat. Hist., ser. 5, vol. iii. p. 274 (1879); Vine.

To these Mr. Waters, Fossil Cyclostomatous Polyzoa from Australia, Quart. Journ. Geol. Soc., vol. xl., 1884, p. 686, adds the following fossil forms:—

Entalophora raripora, d'Orb., Prod. Pal. Strat., p. 267; Palæont. Franç., p. 787, pl. dcxxi. figs. 1–3, pl. dcxxiii. figs. 15–17; Beissel, Bryoz. Aach. Kreid., p. 82, pl. x. figs. 120–128.

Pustulopora virgula, Hagenow, Maast. Kreid., p. 17, pl. i. fig. 3.

Entalophora icaunensis, d'Orb., Palæont. Franç., p. 781, pl. dcxvi. figs. 12–14.

Entalophora attenuata, Stol., Bry. von Latdorf., p. 77, pl. i. fig. 1; Reuss (?), Bry. Crosaro, p. 74, pl. xxxvi. figs. 1, 2.

Entalophora anomale, Manzoni, Bry. Mioc. Aust. ed Ungh., p. 10, pl. ix. fig. 33.

Entalophora haastiana, Stol., Bry. Ora. Bay., p. 102, pl. xvii. figs. 4, 5.

Character.—Zoarium composed of long, straight, alternate, furcate, cylindrical branches, 0·4 to 0·9 mm. in diameter, constituted usually of four longitudinal alternate series of zoœcia which are exserted for about one-third of their length, the exserted tube curving outwards nearly at a right angle and constituted mainly of a peristomal production, ringed, thin, not punctate, with an entire circular orifice about 0·15 mm. in diameter; surface elsewhere finely punctate. Oœcia consisting apparently of a terminal expansion, or of one situated close to a bifurcation.

Habitat.—Station 151, off Heard Island, 75 fathoms, volcanic mud. Off Prince Edward Island, 80 to 150 fathoms.

[Shetland (?), E. Forbes; Mediterranean, Milne-Edwards; Adriatic, Heller; Naples, Waters; Teneriffe and Canaries, d'Orbigny; Madeira, I. G. I.; Gulf of Florida, Smitt; Port Jackson and Queensland, Haswell.]

With respect to the Shetland locality assigned to this species in the Brit. Mus. Cat. on the authority of E. Forbes, as its occurrence in that locality is not noticed either by Mr. Norman or by Mr. Hincks as a British form, and, moreover, is omitted by Professor Smitt in Lists of Scandinavian or Arctic Polyzoa, it is highly probable that some mistake has arisen. It would appear to be a Mediterranean and Atlantic form, extending as far south as the Kerguelen region.

(2) *Pustulopora proboscidioides*, Smitt (sp.) (Pl. IV. fig. 4).

Entalophora probosidioides, Smitt, Florid. Bryoz., vol. i. p. 11, pl. iv. figs. 26, 27.

Character.—Zoarium composed of elongated, forked, cylindrical branches, 0·7 to 1 mm. in diameter, constituted of about six longitudinal series of zoœcia, almost entirely immersed, except a short, cylindrical, exserted portion with a circular orifice, about

0·17 to 0·2 mm., which are disposed irregularly in circular whorls, about 1 mm. apart; surface rough, punctate, even, with very faint indication of longitudinal striation.

Habitat.—Off Marion Island, 50 to 75 fathoms.

(3) *Pustulopora deflexa*, Smitt (sp.) (Pl. IV. fig. 3).

Entalophora deflexa, Smitt, Florid. Bryoz., vol. i. p. 11, pl. v. figs. 28–30; Waters, Ann. and Mag. Nat. Hist., ser. 5, vol. iii. p. 274.
Pustulipora deflexa, Johnst., p. 279, pl. xlviii. fig. 5; Norman, Rep. Brit. Assoc., 1868, p. 310; Marion, Ann. d. Sci. Nat., sér. 6, t. viii. p. 1; Joliet.
Pustulopora deflexa, Heller, Adriat., p. 125.
? *Tubulipora deflexa*, Couch, Corn. Fauna, vol. iii. p. 107, pl. xix. fig. 4.
? *Stomatopora deflexa*, Hincks, Brit. Mar. Polyz., p. 437, pl. lvii. fig. 4.
? *Pustulopora clavata*, Busk, Crag Polyzoa, p. 107, pl. xvii. fig. 1.

Character.—Zoarium composed of very irregular furcate branches, 1 to 1·2 mm. in diameter, constituted of very long cylindrical or very slightly terete ascending zoœcia, often crowded together in fasciculate bundles and varying greatly in length; slightly produced orally, the produced portion curving slightly outwards; surface granular or uneven, sometimes transversely rugose, about 0·2 mm. in diameter. Oœcia ?

Habitat.—Station 151, off Heard Island, 75 fathoms, volcanic mud.

[South coasts of Britain; Shetland, Norman; Gulf of Florida, Smitt; Bay of Naples, Waters; Adriatic, Heller; Marseilles, Marion; Roscoff, Joliet.]

A peculiar feature of this species is the great disposition of the zoœcia to be collected into fasciculate bundles, somewhat in the same way apparently as they are described by Mr. Hincks in his *Stomatopora fasciculata*, from which, however, it differs in other more important particulars, such as the perfectly free and erect habit, and to judge from Mr. Hincks's figure, the less diameter of the zoœcial tubes, and their less entire immersion or connation. In *Stomatopora fasciculata*, moreover, the zoarium is described as having a dense and smooth surface and a dark brown colour.

Mr. Couch's description of *Tubulipora deflexa* is far too incomplete to afford any assistance towards its determination, and his figure is still less reliable. All he says is that the zoarium is erect, cylindrical, with waved tubes projecting from all parts. Mr. Hincks, however, states, with respect to his *Stomatopora deflexa*, that the "zoarium is in great part adherent; with linear branches expanding very slightly upwards, the extremities free, erect, subclavate. The zoœcia slender, disposed in pairs along the creeping portion, and semialternate or alternate, the oral extremity free, bent upwards, and projecting considerably." To this it may be added that Mr. Hincks rejects Professor Smitt's *Entalophora deflexa* as a synonym of his *Stomatopora deflexa*. So that on the whole it seems extremely doubtful what name should be assigned to the form here described, with respect to which all that appears to me to be certain is that the specimens (mere fragments) in the Challenger collection are identical with the form

described by Professor Smitt as *Entalopora deflexa*. It is scarcely possible that Mr. Hincks's *Stomatopora* should be the same, but to indicate the possibility that it may be a recent variety, I have retained the specific appelation for a decided *Pustulopora*, for which otherwise the name "*fasicularis*" would have been very appropriate.

(4) *Pustulopora regularis*, Macgillivray (Pl. IV. fig. 2).

Pustulopera (*sic*) *regularis*, Macgilliv., Proc. Roy. Soc. Vict., vol. xix., 1882, p. 292, pl. i. fig. 3.
? *Pustulopora subverticillata*, Busk, Crag Polyzoa, p. 108, pl. xviii. fig. 1*d*.

Character.—Zoarium branched, branches of uniform thickness (about 1 to 2 mm.), furcate and ending in a short fork. Entire surface studded with the exserted extremities of the immersed zoœcia, disposed quincuncially or in nearly regular subspiral series, and about eight in the width of the zoarium. Orifice 0·12 to 0·15 mm. in diameter. Surface of zoœcia punctate, except the peristomal production which is clear, vitreous, shining and ringed. Oœcia ?

Habitat.—Station 162, off East Moncœur Island, Bass Strait, 38 fathoms, sand and shells.

[Port Philip Heads, Macgilliv.]

Probably, as suggested by Mr Macgillivray, allied to *Entalophora subregularis*, d'Orbigny.

SUBDIVISION B. ADNATA SEU DECUMBENTIA.

Family III. TUBULIPORIDÆ, Busk.

Tubuliporidæ, Bk., Crag Polyzoa; Brit. Mus. Cat. pt. iii. p. 23.
Tubuliporidæ (pars), Johnst., Blainville, Milne-Edwards ("*Tubulipores*"), Smitt, Alder, Gray, Hincks, Vine, &c.
Sparsidæ (pars) d'Orbigny.

Character.—Zoarium entirely adnate, partially erect from an expanded base, in shape linear, reniform, flabelliform, or claviform; simple or divided into branching lobes. Zoœcia distinct, more or less free and much elongated; irregularly disposed or ranged in more or less regular series, diverging from a mesial line. Oœcia formed by an inflation of the branch.

The Family here contains:—

1. *Alecto*, Lamx.
   (1) *Alecto granulata*, M.-Edw.
2. *Tubulipora*, Lamk.
   (1) *Tubulipora flabellaris*, Fab. (Pl. V. fig. 1).
   (2) *Tubulipora fimbria*, Lk. (Pl. V. fig. 2).

1. *Alecto*, Lamouroux.

Alecto, Lamx., 1821; Blainville, Johnston, M.-Edw., Busk., Michelin, Gray, Norman, Heller, &c.
Tubulipora (pars), Lamk., Smitt.
Stomatopora, Bronn, d'Orb., Hincks (pars), &c.
Aulopora (pars), Goldfuss, Reuss.
Diastopora, (pars), Smitt.
? *Proboscina* (pars), Audouin, d'Orb., Smitt (subgenus).

Character.—Zoarium closely adnate throughout; simple or branched; linear or ligulate. Zoœcia uniserial, or disposed in distant, more or less regular, transverse series of two to four.

(1) *Alecto granulata*, Milne-Edwards.

Alecto granulata, M.-Edw., Réch. sur les Crisies, p. 13, pl. xvi. fig. 3, 3*a*; Johnston (pars), Busk, Brit. Mus. Cat., pt. iii. p. 24, pl. xxxii. fig. 1; Joliet.
? *Alecto parasitica*, Heller, Manzoni.
Stomatopora granulata, d'Orb., *loc. cit.*, p. 836, pl. 628, figs. 5–8; Hincks, Brit. Mar. Polyz., p. 425, pl. lvii. figs. 1, 2.

Character.—Zoarium linear, branched, the branches often anastomosing. Zoœcia uniserial, decumbent, with the oral extremities raised, subventricose below; surface granular or coarsely ringed.

Habitat.—Off Inaccessible Island, Tristan da Cunha, 60 to 90 fathoms (on dead shell). [British and Irish coasts; Norway and Sweden, Roscoff, &c.]

2. *Tubulipora*, Busk.

Tubulipora, Bk., Engl. Cyclop., art. Polyzoa, col. xv.; Crag Polyzoa, p. 110; Lamouroux, Hagenow, &c., Bk., Brit. Mus. Cat., pt. iii. p. 24.
Tubulipora (pars), Lamarck, Blainville, M.-Edwards, Johnston, Lonsdale, Michelin, Reuss, d'Orbigny, Gray, Smitt (1867), Hincks, &c.
Ceriopora (pars), Hagenow.
Phalangella sp., Gray, Smitt (subgenus).
Proboscina sp., d'Orbigny.

Characters.—Zoarium springing from a minute subglobular or discoid cell, and expanding as it grows, into an irregularly lobate, or entire, reniform or fan-shaped, adnate growth, from which spring the elongated, cylindrical, tubular zoœcia, free or partially connate and ascending; disposed more or less regularly in series diverging from a mesial line or irregularly.

(1) *Tubulipora flabellaris*, Fabricius (sp.) (Pl. V. fig. 1).

Tubipora flabellaris, Fab., Faun. Grœnl., p. 430, 1780.
Tubulipora flabellaris, Manzoni, Hincks, Brit. Mar. Polyz., vol. i. p. 446, pl. lxiv. figs. 1–3.
Tubulipora (subgenus *Phalangella*) *flabellaris*, Smitt, 1866; Kritisk Förteckn., pp. 401, 455, pl. ix. figs. 6, 8.
Tubulipora phalangea, Couch, Corn. Fauna, vol. iii. p. 106, pl. xix. fig. 7; Johnston, Busk, Crag Polyzoa, p. 111, pl. xviii. fig. 6; Hincks, Devon. Cat., Ann. and Mag. Nat. Hist., ser. 3, vol. ix. p. 308; Busk, Brit. Mus. Cat., pt. iii. p. 25, pl. xxiii.; Waters, &c.
Tubulipora verrucaria, M.-Edw. (pars), Réch. sur les Tubulipores, p. 3, pl. xii. fig. 1; Heller.
Phalangella phalangea, Gray.

Character.—Zoarium wholly adnate, suborbicular or reniform, or obsoletely lobate; tubular cells long, slender, 0·15 mm. in diameter, disposed in more or less regular, uniserial rows radiating from a mesial line. Walls of free portion of zoœcia ringed, not punctate. Basal expansion thickly punctate.

Habitat. Station 315, lat. 51° 40′ S., long. 57° 50′ W., 12 fathoms, sand and gravel.

[British and Irish Seas; Arctic Sea; coast of Norway; South Labrador; Adriatic, Bay of Naples.]

Professor Smitt and Mr. Hincks appear to be so convinced that this is the form intended by Fabricius that I have thought it better to adhere to their determination and to adopt his appellation instead of Mr. Couch's.

One peculiarity as distinguishing this form from the very closely allied *Tubulipora fimbria*, Lamk., consists in the absence, so far as I have observed, of punctation of the walls of the tubular or free portion of the zoœcia, which in the latter species are sparsely punctate up to the border of the orifice, also the punctation of the basal expansion in *Tubulipora fimbria* is rather more sparse, and the spots or pores larger.

(2) *Tubulipora fimbria*, Lamarck (Pl. V. fig. 2).

? *Tubipora serteus*, Fab.
Tubulipora fimbria, Lamk., Hist. Anim. sans Vert., ed. 1, vol. ii. p. 163, ed. 2, vol. ii. p. 243; Smitt, (subgenus *Phalangella*), *loc. cit.*, p. 401, 452, pl. ix. fig. 5; Hincks, Brit. Mar. Polyz., p. 448, pl. lx. fig. 3.
Tubulipora fimbriata, M.-Edw., *loc. cit.*, p. 10, pl. xiv. fig. 2; Michelin, Iconog., p. 321, pl. lxxvii. fig. 7.
Tubulipora flabellaris, Johnst., p. 274, pl. xlvi. figs. 5, 6; Landsb., Pop. Hist. Brit. Zooph., p. 274, pl. xv. fig. 50; Busk, Crag Polyzoa, p. 111, pl. xviii. fig. 3, pl. xx. fig. 9; Brit. Mus. Cat., pt. iii. p. 25, pls. xxiv., xxv.; Hincks, Ann. and Mag. Nat. Hist., ser. 4, vol. xix. p. 109; Haswell, Joliet.

Character.—Zoarium adnate, flabelliform, often recurved on the sides. Zoœcia decumbent, irregularly disposed or very obscurely serial. Surface of basal expansion and tubes punctate, often transversely rugose. Zoœcia about 0·15 to 0·17 mm.

Habitat.—Station 315, lat. 51° 40′ S., long. 57° 50′ W., 12 fathoms, sand and gravel.

[Northern coast of Britain; Shetland; Ireland; Greenland, Fabricius; Davis Strait,

100 fathoms; Gulf of St. Lawrence; Spitzbergen; West of Nova Zembla, lat. 72° 30′ N., long. 52° 45′ E., 5 to 20 fathoms, Stuxberg and Théel; Roscoff, Joliet; Port Jackson, Haswell.]

Distinguished from the preceding species, as above observed, by the tubular portions of the zoœcia being punctate up to the border of the orifice, and their rather larger size. There can, I now think, be no doubt as to the distinctness of the two species.

Family IV. Diastoporidæ, Busk.

Diastoporidæ (pars), Bk., Crag Polyzoa, p. 113, Smitt.
Tubuliporidæ (pars), Hincks, &c.

Character.—Zoarium crustaceous or foliaceous, discoid or of indefinite outline; adnate and sessile, or pedunculate and erect; no interstitial cancelli.

The Family here contains:—

1. *Diastopora*, Johnston.
   (1) *Diastopora patina.*

1. *Diastopora*, Johnston.

"*Diastopores simples*," M.-Edwards, Réch. sur les Crisies, p. 39.
Diastopora, Johnst., Bk., Crag Polyzoa, p. 113; Brit. Mus. Cat., pt. iii., p. 28; Hincks, Brit. Mar. Polyz., p. 457.
Diastopora (pars), Lamx., M.-Edwards, Blainville, Reuss, Hagenow, Michelin, d'Orbigny, Smitt.
Tubulipora sp., Johnst., Auctt.
Berenicea (pars), Lamx., d'Orbigny.
Patinella, Gray, Hincks, Zooph. S. Devon, Ann. and Mag. Nat. Hist., ser. 3, vol. ix. p. 468.

Character.—Zoarium adnate, discoid or flabelliform, centric or excentric; outline lobed or entire. Zoœcia towards the centre wholly immersed, usually sub-erect and partially free towards the periphery; orifice orbicular or elliptical; horizontal or oblique.

(1) *Diastopora patina*, Lamarck (sp.).

Tubulipora patina, Lamk., Johnst., Gosse, Mar. Zool., pt. iii., p. 8, fig. 1 (*nec* Milne-Edwards); Joliet.
? *Patinella verrucaria*, Gray.
Patinella patina, Hincks, Zooph. S. Devon, Ann. and Mag. Nat. Hist., ser. 3, vol. ix. p. 468.
Diastopora patina, Smitt., Busk, Brit. Mus. Cat., pt. iii., p. 28, pl. xxix. figs. 1, 2, pl. xxx. fig. 1; Hincks, Brit. Mar. Polyz., vol. i. p. 458, pl. lxvi. figs. 1–6; Waters.
? *Discosparsa marginata* (pars), d'Orbigny.
Discosparsa patina, Heller, Marion.

Character.—Zoarium when mature, discoid, circular, cupped, and bordered by a thin expansion. Central zoœcia immersed and usually occluded; marginal ones erect and

open, usually disposed in irregular wavy lines radiating from the centre. (Sometimes gemmiparous, Hincks).

Habitat.—Off Nightingale Island, Tristan da Cunha, 100 to 150 fathoms.

[British and Irish Coasts, northern and southern; North Sea, Arctic Ocean, 5 to 10 fathoms, on Fucus, Flustra, &c., and on shells and coral from 50 to 100 fathoms, Smitt; coast of Norway, Lovén; Shetland, Barlee, 170 fathoms; Adriatic, Heller; South Labrador; Marseilles, Marion; Roscoff, Joliet.]

Family V. LICHENOPORIDÆ.

Lichenoporidæ, Smitt, Hincks, &c.
Discoporadæ, Bk., Engl. Cyclop.
Caveidæ (pars), d'Orbigny.
Tubigeridæ (pars), d'Orbigny.
Discoporellidæ, Bk., Brit. Mus. Cat., pt. iii. p. 30, 1875.

Character.—Zoarium discoid, simple or confluent; adnate or substipitate, interzoœcial spaces cancellate (cancelli sometimes obsolete). Zoœcia erect or suberect, disposed more or less regularly in series diverging from an open central area.

The Family here contains:—

Lichenopora.

(1) *Lichenopora fimbriata*, Bk.
(2) *Lichenopora hispida*, Flem.

1. *Lichenopora*, Defrance.

Madrepora (pars), Fabr., Esper.
Lichenopora, Defrance (1823), Blainville, Michelin, Smitt (1878), Hincks, Brit. Mar. Polyz., p. 471.
Discoporella, Gray, Brit. Mar. Rad.; Busk, Crag Polyzoa, and Brit. Mus. Cat., pt. iii. p. 30; Smitt, Kritisk Förteckn., p. 405 (1865).
Discopora (pars), Flem. (*non* Lamk.), Busk, Engl. Cyclop. Polyz.
Tubulipora (pars), Johnst., M.-Edw., &c.
Defrancia (pars), *Actinopora*, *Discocavea*, *Unicavea*, &c., d'Orb.
Heteroporella sp., Hincks.

Character.—Zoarium sessile, usually closely adnate, with a thin calcareous border; discoid, raised in the centre (hemispherical, conical, or subconical). Zoœcia partly free, disposed irregularly or in lines radiating from the centre. Mouth acuminate or toothed.

(1) *Lichenopora fimbriata*, Busk.

Discoporella fimbriata, Bk., Brit. Mus. Cat., pt. iii. p. 32, pl. xxvii.

Character.—Zoarium subconical or hemispherical; zoœcia indistinctly serial, distant; interstitial cancelli or pores small, circular, often more or less obsolete; orifice somewhat expanding; peristome fimbriate, with a variable number of pointed teeth.

Habitat.—Off Nightingale Island, Tristan da Cunha, 100 to 150 fathoms.

[Chonos Archipelago, 13 fathoms; Tierra del Fuego, Cape Horn, 40 fathoms; Chiloe, 96 fathoms, Darwin; Tasmania, Mr. Smith.]

(2) *Lichenopora hispida*, Fleming (sp.).

Discopora hispida, Fleming, Blainville, Couch.
Tubulipora hispida, Johnst.
Discoporella hispida, Gray; Busk, Crag Polyzoa, p. 115, pl. xviii. fig. 5; Brit. Mus. Cat., pt. iii. p. 30, pl. xxx. fig. 3; Smitt, Sars, Alder, &c.
Heteroporella radiata, Bk., Crag Polyzoa, p. 127, pl. xix. fig. 2.
Heteroporella hispida, Hincks, Ann. and Mag. Nat. Hist., ser. 3, vol. ix. p. 469.
Lichenopora hispida, Hineks, Brit. Mar. Polyz., p. 473, pl. lxviii. figs. 1–8.

Character.—Zoarium suborbicular, convex, with or without a narrow marginal lamina; surface uniformly covered with circular openings level with the surface, of tolerably uniform size; towards the border some of the orifices raised, subtubular, and bi- or tridenticulate, disposed in obscure irregular series.

Habitat.—Stations 135 to 135*e*, Tristan da Cunha, 100 to 1100 fathoms.

[British Coasts, north and south; Northern Seas, Greenland, Labrador, &c. (fossil, Coral Crag; Post Pliocene, Canada).]

Family VI. Frondiporidæ, Smitt.

Fasciculinea (pars), d'Orbigny, Smitt, 1866.
Fascigeridæ (pars), d'Orbigny.
Frondiporidæ, Smitt, Kritisk Förteckn., pp. 407, 408 (1866); Busk, Brit. Mus. Cat., pt. iii. p. 37.
Cerioporidæ (pars), Busk, Crag Polyzoa, p. 118.
Cerioporinæ (pars), Hagenow.

Character.—Zoarium massive, stipitate, simple or lobate, or ramose. Zoœcia connate throughout, aggregated into fasciculi; lumen of tubes angular; walls finely porous; sides of lobes or fasciculi faintly striated or subporcellanous; no intermediate pores or cancelli.

The Family here contains :—

1. *Fasciculipora*, d'Orb.

(1) *Fasciculipora ramosa*, d'Orb.

2. *Supercytis*, d'Orb.

(1) *Supercytis digitata*, d'Orb. (Pl. V. fig. 3).
(2) *Supercytis tubigera*, n. sp. (Pl. V. fig. 4).

1. *Fasciculipora*, d'Orb.

Fasciculipora, d'Orb. (1839), Busk, Brit. Mus. Cat., pt. iii. p. 37 (pars).
Frondipora, Michelin (pars); Hagenow.
Corymbopora (pars), Michelin.
Corymbosa, sp., d'Orbigny.
Fungella, Hagenow, Bk., Crag Polyzoa, p. 118.

Character.—Zoarium stipitate; capitulum lobate. Zoœcia opening only at the ends of the fasciculi.

(1) *Fasciculipora ramosa*, d'Orbigny.

Fasciculipora ramosa, d'Orb., Voy. Amér. Mérid., Polypiers, p. 20, pl. ix. figs. 22–24.
? *Frondipora ramosa*, Hagenow.
Corymbosa ramosa, d'Orb., Cours Elém. de Pal., tom. ii. p. 109, 1851.
? *Fungella prolifer*, Hagenow, Maast. Kreid., p. 37, pl. iii. figs. 6, 7 (?).

Character.—Zoarium fungiform; capitulum composed of numerous obtuse, rounded lobes (usually in pairs); each lobe constituted of a thick fasciculus of tubular cells of large calibre and very thin walls, with a few intermediate tubes of less diameter interspersed; outer surface smooth, dotted obscurely, showing the outline of the elongated zoœcia, or thickened and porcellanous.

Habitat.—Off Inaccessible and Nightingale Islands, Tristan da Cunha, 60 to 150 fathoms.

[South Patagonia, 48 fathoms, Darwin, d'Orbigny.]

Fasciculipora ramosa bears a close resemblance to *Fungella multifida*, mihi, of the Crag (pl. xvii. fig. 4), but in that species, which probably corresponds with *Frondipora marsilli* of Michelin (Iconog., p. 68, pl. xiv. fig. 4). The whole growth appears more squat or depressed, and the lobes shorter and not in pairs, whilst the outer surface towards the base is marked with hexagonal areolæ, an appearance not seen in *Fasciculipora ramosa*. Otherwise the two forms appear to be closely allied.

2. *Supercytis*, d'Orbigny.

Supercytis, d'Orbigny, Palæont. Franç., p. 1060; Waters, Quart. Journ. Geol. Soc., vol. xl., 1884, p. 692.
Fasciculipora (pars), d'Orbigny; Busk, Brit. Mus. Cat., pt. iii. p. 37.

Character.—Zoarium stipitate; capitulum expanded, flat or cupped, with numerous furcate or trifid fasciculi projecting round the border. Fasciculi compressed, constituted of coalesced, almost completely immersed zoœcia of varying lengths, all of which open on the upper flattened side of the fasciculus or at the extremity. Dorsal surface rounded, even, longitudinally striated and minutely punctate. Oœcia (when present) hemispherical, at the base of the fasciculi, and usually on the upper surface.

It is not easy to assign its proper family place to this peculiar type, but on the whole it would perhaps be more at home among the Fasciculinæ or Frondiporidæ, than elsewhere, the main difference between it and the other members of the group consisting in the openings of the zoœcia not being altogether terminal but partly on the upper side of the lobes or lateral fasciculi, or more rarely on the central area of the capitulum, which in one of the forms here described, in the perfect and perhaps more or less immature state, is covered with an even, calcareous, minutely punctate lamina, marked out into very regular hexagonal areolæ, from some of which, towards the border, may be seen the slightly projecting orifices of zoœcia. In the second species the hexagonal areolation is apparently wanting, and in this form a few long tubular zoœcia project at the base of some of the fasciculate lobes.

In the British Museum Catalogue I have described and figured, under the name of *Fasciculipora digitata*, a species, which as pointed out by Mr. Waters (*loc. cit.*, p. 692), is in all probability identical with M. d'Orbigny's *Supercytis digitata*, but in that specimen, which was a good deal worn, the hexagonally areolated, calcareous lamina of the central area is absent, and nothing is seen but the open orifices of what might be taken for the interstitial cancelli characteristic of the Lichenoporidan group. There can, however, I think, be no doubt that they represent the orifices of stunted or undeveloped zoœcia, because, firstly, towards the base of the digitiform lateral fasciculi many of the areolæ are actually developed into short zoœcial tubes; and secondly, in none can be traced a vestige of the internal ciliary processes which are seen almost universally in true interstitial cancelli. Besides these marginal stunted zoœcia, there may be seen in all parts of the central area similar projecting orifices, which are described by Mr. Waters as the ends of central zoœcia slightly exserted, and which, as he remarks, give this portion the aspect of a *Diastopora*, such as *Diastopora sarniensis*.

(1) *Supercytis digitata*, d'Orbigny (Pl. V. fig. 3).

Supercytis digitata, d'Orb., Palæont. Franç., p. 1061, pl. dccxcviii. figs. 6–9; Waters, *loc. cit.*, p. 692, pl. xxxi. figs. 22, 26, 27.
Fasciculipora digitata, Bk., *loc. cit.*, p. 37, pl. xxxiii. fig. 1.

Character.—Zoarium oblong, 0·12 × 0·8 mm.; the stipitate capitulum flattened above, presents a large central area covered with a hexagonally areolated lamina, and from the sides project twelve digitate, forked, or sometimes trifid compressed lobes, composed of longer or shorter tubular zoœcia, about 0·2 mm. in diameter, almost completely immersed or sometimes slightly projecting, and opening throughout the whole length of the lobe on its upper flattened aspect, and some from the areolæ of the central area. Dorsal aspect of the lobes rounded, even, longitudinally striated and minutely punctate. Oœcia?

Habitat.—Station 167, lat. 39° 32′ S., long. 171° 48′ E., 150 fathoms, blue mud.

[Cape Capricorn, Australia, H.M.S. "Rattlesnake." Fossil, Cretaceous, Meudon, &c., d'Orbigny; South Australia, Waters.]

(2) *Supercytis tubigera*, n. sp. (?) (Pl. V. fig. 4).

Character.—Zoarium stipitate, capitulate; capitulum irregular or inequilateral; central area small, not areolated, but covered with a thickish calcareous lamina, with concentric rugæ, giving it a conchoidal aspect; ten or twelve marginal fasciculate or digitate bi- or trifurcate compressed processes, in which the zoœcia are disposed more or less regularly in series of connate tubes, opening either at the extremity of the fasciculus or on its upper flattened aspect; at the base of some of the fasciculi a few much elongated tubular zoœcia arise nearly vertically, with punctate walls, and about 0·25 mm. in diameter. Dorsal surface of fasciculi and capitulum striated and minutely punctate. Oœcia in the form of hemispherical projections at the base of the lateral fasciculi and usually on the upper aspect.

Habitat.—Station 151, off Heard Island, 75 fathoms, volcanic mud.

As the collection affords only a single specimen, which conveys the impression of a somewhat distorted growth, it may, perhaps, be merely a variety of the preceding. But the absence of areolation of the central area of the capitulum and the presence of the much elongated tubular zoœcia, together with the occurrence of the hemispherical oœcia, appeared to me to justify its being considered specifically distinct.

Sub-Order III. CTENOSTOMATA, Busk.

Ctenostomata, Busk, Hincks, Smitt, Auctt.
Halcyonellea and *Vesicularina*, Johnst.

Character.—Zoœcial orifice simply circular, bilabiate (?) or quadrangular; retractile; border contractile, furnished with a setose or membranous fringe or velum. Zoarium corneous or membranaceous, or carnose; never calcified. No marsupial or appendicular organs.

Division I.—HALCYONELLEA.

Halcyonellea, Ehrenberg, Hincks.
Polyzoa carnosa, Gray.
Alcyonidulæ, Johnst.
Halcyonelleæ, Smitt.

Character.—Zoarium membranous or carnose, or semigelatinous, developed by continuous gemmation of the zoœcia from each other.

This division, embracing in Mr. Hincks' classification the genera

Alcyonidium,
Flustrella,
Arachnidium,

is represented in the Challenger collection by a single species referable to *Alcyonidium*.

Family I. Alcyonidulæ.

Alcyonidulæ, Couch.
Halcyonelleæ, Smitt.
Alcyonidiidæ, Hincks.

Character.—Zoœcia more or less closely united, immersed in an expanded and adherent gelatinous crust, or forming an erect, cylindrical or compressed zoarium; orifice closed by the invagination of the tentacular sheath.

The Family here contains :—

1. *Alcyonidium*, Lamouroux.

(1) *Alcyonidium flustroides*, n. sp. (Pl. X. figs. 13, 14).

1. *Alcyonidium.*

Alcyonidium, Lamx., Johnst., Couch, Busk, Engl. Cyclop., art. Polyz.; Hincks, &c.
Alcyonium (pars), Linné, Pallas, Müller, Fleming, &c.
Halodactylus, Farre, v. Beneden.
Cycloum and *Sarchochitum*, Hassall.

Character.—Zoœcia immersed or subimmersed. Orifice usually papillæform, more or less exsertile. Zoarium erect and lobate or crustaceous or repent.

(1) *Alcyonidium flustroides*, n. sp. (Pl. X. figs. 13, 14).

Character.—Zoarium erect and foliaceous, much branched, extending to 4 or 5 inches; bilaminate, compressed and flustroid. Zoœcia polygonal, arranged in irregular longitudinal series, the septa between which are raised and strongly marked. The substance of the walls semigelatinous, irregularly dotted with small black granules. Orifice minute, papillæform, superior. Polypide with about sixteen tentacles. Ova scattered, usually singly, in the zoœcia. Width of branches about 4 mm.; zoœcia irregular in size, from about 0·8 × 0·4 mm. to 1·6 × 0·6 mm.

Habitat.—Station 142, lat. 35° 4′ S., long. 18° 37′ E., 150 fathoms, green sand.

This species forms straggling tufts of loosely entwined and sometimes anastomosing branches, which are quite soft and flexible in the upper part, though the stem and lower branches become hard and firm near the base. Sometimes the branches embrace and adhere firmly to some foreign substance, such as worm tubes, &c. The structure is at first sight very obscure, as the substance is very thick and opaque; immersion for a short time in acid, however, renders it much more transparent and enables the nature of the zoœcia to be seen. Many of these contain polypides alone, others polypides and ova together, and others again either "brown bodies" or scattered ova only. The orifices are very small and often quite obscure. The walls seem to be partly membranous and partly of a semigelatinous nature, irregularly dotted with small black granules which are possibly argillaceous. In the form of the cell and the raised septa this species resembles *Alcyonidium mytili*, as described by Mr. Hincks,[1] but entirely differs from that form in its erect bilaminate mode of growth.

[1] Brit. Mar. Polyz., p. 498, pl. lxx. figs. 2, 3.

Division II.—VESICULARINA.

Vesicularina (pars), Johnst.
Stolonifera, Ehlers, Hincks.
Les centrifuginés radicellés (pars), d'Orb.
Vesiculariea, Smitt.

Character.—Zoarium corneous, developed by the continuous segmentation of a branching stem or stolon, having a transverse diaphragm at each node. Zoœcia budding directly from the internodes and not from each other.

Family II. Vesiculariidæ.

Vesiculariadæ, Johnst., Alder, &c.
Vesiculariidæ and *Valkeriidæ*, Hincks.
Vesiculariea, Smitt.

Character.—Zoarium erect, free and ramose or radicate, repent or stoloniferous. Zoœcia deciduous or readily detached, leaving a circular area filled in by a perforated diaphragm. Wall entire all round, without any membranous area.

The Family here contains the following genera:—

1. *Amathia*, Lamouroux.

   (1) *Amathia lendigera*, Linn.
   (2) *Amathia distans*, n. sp. (Pl. VII. fig. 1).
   (3) *Amathia brasiliensis*, n. sp. (Pl. VII. fig. 2).
   (4) *Amathia spiralis*, Lamx. (Pl. VI. fig. 2).
   (5) *Amathia tortuosa*, Woods (Pl. VI. fig. 1).
   (6) *Amathia connexa*, n. sp. (Pl. VI. fig. 3).
   (7) *Amathia semispiralis*, Kirchenpauer (Pl. VIII. fig. 3)

2. *Vesicularia*, J. V. Thompson.

   (1) *Vesicularia papuensis*, n. sp. (Pl. VIII. fig. 1).
   (2) *Vesicularia trichotoma*, n. sp. (Pl. VIII. fig. 4).

3. *Farrella*, Ehrenburg.

   (1) *Farrella brasiliensis*, n. sp. (Pl. VII. fig. 3).

1. *Amathia*, Lamouroux.

Sertularia (pars), Linn.
Amathia, Lamx., d'Orbigny (pars); Kraus, Heller, Hincks, &c.
Serialaria, Lamk., Fleming, Johnst., Blainville, Kirchenpauer, d'Orbigny (pars), Busk, Engl. Cyclop., art. Polyz.; Joliet, Barrois, &c.
Valkeria (pars), Dalyell.

Character.—Zoarium radicate, erect or creeping, with free dichotomous branches. Zoœcia cylindrical or subovoid, with a broad adherent base, and more or less connate laterally; arranged alternately in a double series, disposed spirally, entirely or partially surrounding the internodes, or in a straight line parallel with the axis, or in short distant groups at the upper ends of the internodes.

(1) *Amathia lendigera*, Linné (sp.).

"Nit Coralline," Ellis.
Sertularia lendigera, Linné, Pallas, Ellis and Sol., Lister.
La Sertolara lendinosa, Cavolini.
Amathia lendigera, Lamx., Pol. flex., p. 159; Heller, Hincks, Brit. Mar. Polyz., p. 516, pl. lxxiv. figs. 7–10, &c.
Serialaria lendigera, Lamk, Auctt.
Valkeria lendigera, Dalyell.

Character.—Zoarium much branched, tangled, filamentous; branches dichotomous, about 0·5 × 0·15 mm. Zoœcia subcylindrical, ovate, subcompressed, tapering gradually in a long neck, disposed obliquely in series of four to five pairs close below each joint or bifurcation, and gradually diminishing in length from below upwards. Cells subdistinct, and scarcely connate.

Habitat.—Station 36, off Bermuda, 30 fathoms, coral.

[British and European Seas, *ubique*.]

(2) *Amathia distans*, n. sp. (Pl. VII. fig. 1).

Character.—Zoarium very slender and delicate, straggling, filamentous, very regularly dichotomous. Internodes long, straight, rigid, thick-walled, about 0·15 mm. in diameter, of pretty uniform length, and each completely encircled with a spiral coil, occupying usually not more than the upper half of the internode, the lower portion of which is left bare. Zoœcia ovoid or oblong, about 0·4 or 0·5 mm. by 0·1 to 0·15 mm., distinct or not closely connate, with a short conical neck.

Habitat.—Off Bahia, 10 to 20 fathoms, mud.

This form is at once recognisable by its delicate filamentous growth, and the great distance between the spiral coils, giving it somewhat the aspect of *Amathia lendigera*. Another character is the comparative shortness and distinctness of the zoœcia.

(3) *Amathia brasiliensis*, n. sp. (Pl. VII. fig. 2).

Character.—Zoarium several inches high (?), irregularly branched; branches frequently terminating in two long jointed filaments, which occasionally throw out one or two isolated zoœcia or stunted branches at the nodes. The branches sometimes also commence with two or three barren internodes. Stems about 0·3 mm. in diameter, wall white and delicate. Zoœcia disposed in a more or less complete spiral, which in the younger internodes occupies only the upper part, but in the older nearly their entire length; very distinct, subcylindrical, tapering from the base upwards, about 0·6 × 0·1 mm.; neck long and slender.

Habitat.—Off Bahia, 10 to 20 fathoms, mud.

The striking peculiarity of this form is the tendency of the branches to terminate in two long jointed tags (terminals), usually barren, but sometimes giving off one or two scattered isolated cells in the manner of some of the Vesicularieæ, &c. The comparative distinctness of the zoœcia in the spiral series shows a tendency in the same direction.

(4) *Amathia spiralis*, Lamouroux (Pl. VI. fig. 2).

Amathia spiralis, Lamx., Polyp. Flex., p. 161, pl. iv. fig. 2.; Expos., p. 10, pl. lxv. figs. 16–17; Encyclop., p. 44.
Serialaria convoluta, Lamarck, Schweigger.
? *Serialaria spiralis*, Woods, Proc. Roy. Soc. N.S.W., vol. xi. p. 84, 1877.
? *Amathia bicornis*, Woods, Trans. Roy. Soc. Vict., vol. xvi. p. 102, 1880.

Character.—Zoarium very thick, branched subdichotomously or irregularly, several inches high. Zoœcia subcylindrical, of uniform diameter, very closely connate, 1·0 mm. long, by 0·2 mm. in diameter (at base); the exserted neck thick and very strongly wrinkled; transversely disposed in an apparently continuous spiral from one internode to another, though in reality probably discontinuous at each internode.

Habitat.—Station 161, off entrance to Port Philip, 33 fathoms, sand. Station 162, off East Moncœur Island, Bass Strait, 38 fathoms, sand and shells. Station 163A, off Twofold Bay, 150 fathoms, green mud.

[Bass Strait and Australia, *ubique* (?), Lamx., &c.]

(5) *Amathia tortuosa*, Woods, (Pl. VI. fig. 1).

? *Amathia tortuosa*, Woods, Proc. Roy. Soc. Vict., vol. xvi. p. 89, fig. 6.

Character.—Zoarium 3, 4 or 5 inches high, in thick tufts, when spread out; divaricate, with long subalternate branches; rooted by radical fibres. Dull olive green colour. Stem 0·5 to 0·6 mm. in diameter. Zoœcia slender, about 1 mm. × 0·15 to 0·2 mm., disposed spirally round the internodes, but not always forming quite one turn.

Habitat.—Station 163A, off Twofold Bay, 150 fathoms, green mud.
[Australia, J. T. Woods.]

It appears to me very doubtful whether this is really the form so named by Mr. Woods, who may probably not have distinguished it from the next species, which in its general habit seems to resemble the figure of his *Amathia tortuosa* more than the present. However, I am led to suppose that he had this one in view from his remark respecting the great length of the cells, which in my *Amathia connexa* are rather short. What Mr. Woods intends by "a crescentic mouth, without setæ or spines," I do not clearly understand; and it should moreover be remarked, that in his figure of *Amathia tortuosa* the cells are not represented by any means as unusually long.

(6) *Amathia connexa*, n. sp. (Pl. VI. fig. 3).

Character.—Zoarium 3 to 4 inches high, very irregularly branched, straggling, forming dense tufts. Stem and branches from 0·5 to 0·6 mm. in diameter, transparent as glass, each internode encircled with a spiral series of zoœcia not extending its entire length, but leaving a space at each end clear. Branches here and there connected by transverse barren tubes. Zoœcia oblong, 0·5 × 0·13 mm., abruptly rounded (the neck projecting about 0·2 mm.), connivent, very delicate walls, so that the outlines towards the summits are very indistinct.

Habitat.—Station 186, off Cape York, 8 fathoms, coral mud.

The main characteristics of this form consist in—

1. The comparatively large diameter of the segmented stems and the beautiful glassy transparency of their walls, upon which the encircling series of zoœcia appear to stand out in strong relief, so as at first sight to seem as if they were disposed on one side only of the segment; but examination shows that in reality they form nearly or wholly complete circles round the stem.

2. A second very striking feature, that I have not noticed in any other species of *Amathia*, is the occasional connection of the branches by transverse, barren, segmented tubes, resembling a similar arrangement in some of the Cheilostomata. As observed in the description of the preceding species, the general habit of *Amathia connexa* closely resembles that of Mr. Woods' *Amathia tortuosa*, as shown in his figure, which is copied in the accompanying woodcut. But that *Amathia connexa* should be the species intended by him under the name *tortuosa* is contradicted, as has been remarked, by the comparative shortness of the zoœcia.

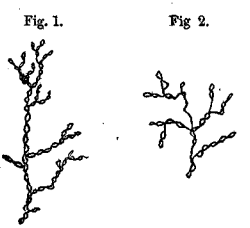


Fig. 1.—*Amathia connexa.*
Fig. 2.—*Amathia tortuosa*, Woods.

(7) *Amathia semispiralis*, Kirchenpauer (sp.) (Pl. VIII. fig. 3).

Serialaria semispiralis, Kirchenpauer, Cat. Mus. Godeffroy, vol. iv. p. xxxiv., 1869.

Character.—Zoarium filamentous, dichotomous; stem brownish, about 0·3 mm. in diameter. Zoœcia disposed in short series, composed of four to eight pairs of cells; series distant, placed obliquely, three or four in each internode; zoœcia slender, cylindrical or somewhat quadrangular in form, about 0·6 to 0·7 × 0·15 mm., obtuse and strongly wrinkled transversely at the closed end; neck very short, and setæ short.

Habitat.—Station 188, lat. 9° 59′ S., long. 139° 42′ E., 28 fathoms, green mud.

[Samoa, Kirchenpauer.]

It may be doubtful whether this form is really that intended by Kirchenpauer, who (*loc. cit.*) describes the zoarium as "dichotomously branched. The cells dispersed in biserial groups, at certain distances apart, and spirally round the stem; each spiral, however, extending only about one-half round the axis. From *Serialaria semiconvoluta*, Lamk., it differs in the character that in that species the tubular cells form much longer rows, whilst it also has an entirely different habit." How M. Kirchenpauer can bring it at all in comparison with the *Serialaria continhii*, which in habit more resembles a Mimosella, is more than I can imagine. No two things would appear to be more distinct.

2. *Vesicularia*, Thompson.

Vesicularia, J. V. Thompson (pars); Farre, Johnst. Busk, Engl. Cyclop.; Hincks, Brit. Mar. Polyz., p. 512, &c.
Sertularia (pars), Linné, Pallas, &c.
Laomedea (pars), Lamx., Blainville.
Valkeria (pars), Fleming.

Character.—Zoarium erect, radicate, or rooted by a fibrous base. Zoœcia distinct, usually distant, disposed in a single row or alternately in two rows on one face only of the stems. (Polypides with a gizzard, Hincks).

(1) *Vesicularia papuensis*, n. sp. (Pl. VIII. fig. 1).

Character.—Zoarium about $\frac{3}{4}$ inch high, very delicate, branching dichotomously in one plane, at an acute angle, rooted by short radical fibres. Branches composed of three or four internodes, about 0·15 mm. in diameter, and each supporting on one face a double row of zoœcia disposed alternately on each side. Zoœcia ovate, 0·5 × 0·15 mm. (with the neck retracted); neck thick and rather bulbous; surface generally smooth. No gizzard.

Habitat.—Station 188, lat. 9° 59′ S., long. 139° 42′ E., 28 fathoms, green mud.

The distinction between this form and *Vesicularia spinosa* is too obvious to require remark. But there is a second species, which occurred in the "Rattlesnake" collection, and was procured between Cumberland Island and Point Slade, which appears to be very closely allied, and I have, therefore, thought it might be useful to give a description of it, though not strictly belonging to the Challenger Expedition.

(2) *Vesicularia trichotoma* (Pl. VIII. fig. 4).

Character.—Zoarium of irregular straggling growth, main stems or primary branches about 0·2 in diameter, and usually barren, thick-walled. Primary branching, trichotomous, secondary usually furcate. Secondary and tertiary branches much slenderer, thin-walled. The internodes support eight to ten zoœcia, disposed alternately in a double series on only one side of the branch; in the youngest segments there is only a single row. Zoœcia very readily detached, ovoid, and about 0·4 × 0·2 mm. The surface is smooth and the neck short.

Habitat.—Bass Strait, between Cumberland Island and Point Slade, Voyage of H.M.S. "Rattlesnake."[1]

A peculiarity at once distinctive of this form is the trichotomous division of the primary branches; the great difference in diameter of the branches is also characteristic, as distinguishing it from the preceding, with which it agrees in the alternate arrangement of the zoœcia on the internodes.

2. *Farrella*, Ehrenburg.

Farrella, Ehrenb., Johnst., Busk, Engl. Cyclop.; Hincks, Brit. Mar. Polyz., p. 528, &c.
Lagenella, Farre, W. Thomson, Hassall.
Laguncula, Van Beneden.

Character.—Zoarium stolonate, free, or creeping and adherent; branching irregularly or at definite intervals. Zoœcia cylindrical or subventricose below, pedunculate. Orifice, when the neck (goulot) is retracted, bilabiate or quadrangular. Neck long, tapering, with or without a crown of setæ.[2] (No gizzard).

(1) *Farrella atlantica*, n. sp. (Pl. VII. fig. 3).

Character.—Zoarium stolonate, filamentous, jointed at regular intervals, free or creeping and adnate. Stolon 0·02 to 0·04 mm. in diameter, throwing out three or four short branches or zoœcia close below each joint at regular intervals. Zoœcia with the

[1] This species does not occur in the Challenger collection.

[2] It does not seem to have hitherto been remarked that the genus *Laguncula* (V. B.), as exemplified in *Laguncula repsus* and *Laguncula elongata*, has no setæ.

neck retracted, about 0·4 mm. long by 0·07 to 0·09 in diameter, cylindrical and of uniform diameter throughout, quadrangular at the orifice when the neck is retracted. Supported on a long peduncle. Surface of peduncle and lower part of cells very finely wrinkled.

Habitat.—Off Bahia, 10 to 20 fathoms, mud. On *Amathia brasiliensis* and *Amathia distans.*

Family III. CYLINDRŒCIDÆ.

Cylindrœciidæ, Hincks, Brit. Mar. Polyz., p. 534.
Vesiculariadæ (pars), Bk., Alder, Hincks.
Vesiculariea (pars), Smitt.

Character.—Zoœcia not deciduous, arising from, and apparently continuous with, the stolon or segment from which they spring. Walls earthy or argillaceous.

The Family here contains the following:—

1. *Cylindrœcium*, Hincks.

(1) *Cylindrœcium papuense* (Pl. VIII. fig. 2).

1. *Cylindrœcium*, Hincks.

Farrella (pars), Bk.
Avenella, Hincks, Gosse (*nec* Dalyell).
Cylindrœcium, Hincks, Brit. Mar. Polyz., p. 535.
Vesicularia (subg. *Avenella*, pars), Smitt.

Character.—Zoœcia uniformly cylindrical or slightly ventricose below, sometimes dilated at the base. Stolon slender, creeping, with occasional enlargements. Zoœcia wide apart or sometimes crowded.

(1) *Cylindrœcium papuense*, n. sp. (Pl. VIII. fig. 2).

Character.—Zoarium a creeping adherent stolon with occasional bulbous thickenings. Zoœcia cylindrical, of uniform diameter and not dilated at the base, 1·3 mm. long by 0·1 to 0·11 mm. in diameter, springing either singly and widely apart from the stolon, or four or five together from a bulbous thickening.

Habitat.—Station 188, lat. 9° 59′ S., long. 139° 42′ E., 28 fathoms, green mud. Parasitic on *Amathia semispiralis*, Kirchenp.

The forms known to me as referable to the genus *Cylindrœcium* as above defined are :—

(1) *Cylindrœcium giganteum*, Busk.

Farrella gigantea, Bk., Quart. Journ. Micr. Sci., vol. iv. p. 93, pl. v. figs. 1, 2; Gosse, Mar. Zool., pt. ii. p. 22, fig. 40.
Avenella gigantea, Hincks, Ann. and Mag. Nat. Hist., ser. 3, vol. ix. p. 473.
Avenella fusca (*forma producta*), Smitt, Kritisk Förteckn., p. 503.
Cylindrœcium giganteum, Hincks, Brit. Mar. Polyz., p. 535, pl. lxxvii. figs. 3, 4.

(2) *Cylindrœcium dilatatum*, Hincks.

Farrella dilatata, Hincks, Quart. Journ. Micr. Sci., vol. viii. p. 279, pl. xxx. fig. 7.
Avenella dilatata, Hincks, Ann. and Mag. Nat. Hist., ser. 3, vol. ix. p. 473.
Cylindrœcium dilatatum (pars), Hincks, Brit. Mar. Polyz., p. 536, pl. lxxix. figs. 1–3.

(3) *Cylindrœcium fuscum*, Busk.

Farrella fusca, Bk., Quart. Journ. Micr. Sci., vol. iv. p. 94, pl. vi. fig. 3.
Avenella fusca, Alder, North. Cat., p. 69; ? Norman, Shetland Polyz., Rep. Brit. Assoc., 1868, p. 311; Smitt (*forma simplex*), Kritisk Förteckn., p. 503.
Cylindrœcium dilatatum (pars), Hincks, Brit. Mar. Polyz., p. 537, pl. lxxvii. figs. 1, 2.

(4) *Cylindrœcium pusillum*, Hincks.

Cylindrœcium pusillum, Hincks, *loc. cit.*, p. 537, pl. lxxx. fig. 8.

(5) *Cylindrœcium pusillum*, var. "*dwarf*," Hincks.

Cylindrœcium pusillum, var. "*dwarf*," Hincks, *loc. cit.*, p. 538, pl. lxxx. fig. 9.

(6) *Cylindrœcium papuense*, n. sp.

The respective dimensions of the zoœcia in these species, so far as they can be made out (mostly from Mr. Hincks's careful figures), are as follows, given in millimetres:—

	Length.		Breadth.
1. *Cylindrœcium giganteum*, ...	3·5	×	0·20–0·25
2. *Cylindrœcium dilatatum*, ...	0·9	×	0·13
3. *Cylindrœcium fuscum*, ...	1·7	×	0·2–0·3
4. *Cylindrœcium pusillum*, ...	1·3	×	0·10–0·13
5. *Cylindrœcium pusillum*, var., ...	0·7	×	0·1
6. *Cylindrœcium papuense*, ...	1·3	×	0·10–·11

From these dimensions it would seem that the form most nearly approaching that in the Challenger collection is the one named *Cylindrœcium pusillum* by Mr. Hincks; from this, however, it differs in the uniform diameter of the zoœcia, which in the latter become wider or subventricose below.

I may take this opportunity of remarking that the form named *Farella fusca* by me, from specimens collected at Newhaven, Firth of Forth, by Mr. W. Thompson in 1849, and which is considered by Mr. Hincks synonymous with his *Cylindrœcium dilatatum*,

seems to differ so much in its comparative dimensions as perhaps to deserve recognition as a distinct species, which might be named *Cylindræcium fuscum*, as being the first of the genus to which that appellative was given.

Group B. ENTOPROCTA, Nitsche.

Entoprocta, Nitsche, Zeitschr. f. wiss. Zool., Bd. xx. p. 34; Hincks, Brit. Mar. Polyz., p. 563.

Character.—Both oral and anal orifices lying within the crown of tentacles; no tentacular sheath. Tentacles contractile but not retractile, arranged bilaterally and symmetrically.

Order PEDICELLINEA.

The only order.

Family I. Pedicellinidæ, Hincks.

Polypiaria pedicellinea, Gervais, 1837.
Pedicellinæ, Johnst.
Pedicellinidæ, Smitt, 1867; Hincks, 1880; Jullien, 1885.

Character.—Polypides deciduous, borne on a more or less muscular, rigid or contractile peduncle; united into colonies by a chitinous ramified stem or stolon.

The general characters of the family Pedicellinidæ are so well and succinctly given by Mr. Hincks[1] as scarcely to require further observation. The chief points to be noticed, as he remarks, besides the Entoproctous anal orifice are—

1. That there is no invagination of the anterior region and therefore no tentacular sheath, and consequently an absence of the retractor muscular fibres by which it is retracted in the Ectoproctæ.

2. That the integument is soft and never calcified, and is closely applied to its contents; *i.e.*, there is no perivisceral cavity containing a fluid as in most other Polyzoa, such small space as there is between the inner wall of the calyx and the contained organs is occupied by a more or less delicate parenchymatous tissue. The integument is composed of a very delicate outer membrane lined by a layer of flattened polygonal cells. The outer membrane or ectocyst is prolonged beyond the visceral mass and forms the side of the vestibular cup-like chamber, within the transparent walls of which the tentacles are usually seen coiled. The tentacles arise from the upper edge of the inner surface of this cup, and their outer surface is formed by a prolongation of the transparent ectocyst, whilst the inner is covered by a more opaque layer of ciliated cells. The vestibular chamber is separated from the visceral part of the polypide by a thin lamina

[1] Brit. Mar. Polyz., vol. i. p. 563.

(intra-tentakuläre Leibeswand, Nitsche), through which passes on one side the œsophagus and on the other the rectum.

3. All the Pedicellinidæ are furnished with a more or less mobile stem, which is either flexible and contractile throughout, or as in *Pedicellina gracilis*, partially flexible and partially rigid, or as in *Ascopodaria*, wholly rigid and chitinous, its motions being effected by a peculiar muscular apparatus at the lower end.

The only forms belonging to this Family that I have noticed in the Challenger collection belong to an apparently distinct genus, to which in 1878 I had given the MS. name of "*Ascopodaria*," as stated in Professor Allman's Linnæan address of 1879. In 1880, however, Mr. Hincks, in a description of some Arctic Polyzoa, described and figured under the name of *Barentsia bulbosa*, a pedicelline species, which, though apparently quite distinct specifically from either of the two Challenger forms, evidently belongs to the genus I had already proposed to establish. In strict right of priority of publication, therefore, his name should have precedence over that merely provisionally given by me, and I should without hesitation have adopted it, but since then he has described and figured a second species, referable, from my point of view, to the same genus, under the name of *Pedicellinopsis fruticosa*,[1] thus giving two distinct names to the same generic type. I have, therefore, felt justified in retaining my original appellation, and in regarding *Barentsia* and *Pedicellinopsis* as synonyms. As an additional argument, though one of less weight, in favour of the course I have pursued, I might cite the appropriateness of the title I chose, indicative as it is of the main peculiarity of the genus.

The Family here contains:—

1. *Ascopodaria*.

   (1) *Ascopodaria fruticosa*, Hincks, sp. (Pls. IX., X. figs. 1–5).
   (2) *Ascopodaria discreta*, n. sp. (Pl. X. figs. 6–12).

1. *Ascopodaria*, Busk.[2]

Ascopodaria, Bk. (MS.), Add. by Prof. Allman, Journ. Linn. Soc. Lond. (Zool.), vol. xv. p. 2.
Barentsia, Hincks, Ann. and Mag. Nat. Hist., ser. 5, vol. vi. p. 285; Vigelius, Bijd. Dierk. Genoot., Nat. Art. Mag., Amsterdam, Aflev. ii. pt. 2, p. 85.
Pedicellinopsis, Hincks, *loc. cit.*, vol. xiii. p. 363.
Pedicellina (pars), Sars, Leidy.

Character.—Polypide budding from and supported at the extremity of a chitinous, tubular, perforated stem, which expands below into a cylindrical, barrel-shaped dilatation, lined internally by a layer of longitudinal muscular tissue.

[1] This species is the same as one of the two Challenger forms to which I had given the name of *Ascopodaria socialis*, but I have now as a matter of course adopted Mr. Hincks specific name.

[2] From ἀσκός, a wine-skin, πούς, a foot.

The structure of the peduncle is the character by which this genus is distinguished from *Pedicellina*. The pedicel is rigid and chitinous throughout, and depends for its motion on the muscular fibres which line the barrel-shaped expansion at the base; the central cavity of this expansion as well as of the rest of the stem being filled with an extremely delicate parenchymatous tissue.

The anatomy of the polypides appears to agree almost entirely, as far as I have been able to observe it in the spirit specimens, with the very careful descriptions given by Dr. Nitsche in his paper on *Pedicellina echinata*.[1] The whole polypide or calyx is enveloped in a delicate transparent membrane or ectocyst, lined with a more or less distinct tesselated epithelium. The alimentary canal consists of an œsophagus, stomach, intestine and rectum (Pl. IX. fig. 6); the liver cells extending along the upper side of the stomach present the usual deep yellow colour. In all the specimens that I have examined the rectum lies in a horizontal position forming an angle with the rest of the intestine; whether this is its normal position, as it appears to be in the closely allied genus *Urnatella*[2] or whether it merely is the case during a young stage of growth, as mentioned by Dr. Nitsche, I am unable to decide. I have not been able to observe with any certainty the reproductive organs; but in nearly all the polypides of one species, *Ascopodaria fruticosa*, between the stomach and the base of the vestibular cavity, there are two large, round, ovarian masses (Pl. IX. figs. 6, 8, 9), which are separated from one another by a thin lamina (Pl. IX. fig. 9). In the other species these masses are not apparently always present.

Mr. Hincks has suggested[3] that his genus *Pedicellinopsis* would properly include the *Pedicellina gracilis* of Sars; in this I am disposed fully to agree with him and should therefore propose to include it in my genus *Ascopodaria*. Professor Leidy[4] refers to a species of *Pedicellina* found by him in 1859, which, from the short description given, if not identical with *Pedicellina gracilis*, ought also to be placed in this genus. The known species therefore would be four or five, as follows:—

(1) *Ascopodaria gracilis*, Sars.
(2) *Ascopodaria bulbosa*, Hincks.
(3) *Ascopodaria fruticosa*, Hincks=*socialis*, Bk., MS.
(4) *Ascopodaria discreta*, Bk.
(5) *Ascopodaria* (?), Leidy.

(1) *Ascopodaria fruticosa*, Hincks, sp. (Pls. IX., X. figs. 1–5).

Pedicellinopsis fruticosa, Hincks, Ann. and Mag. Nat. Hist, ser. 5, vol. xiii. p. 364, pl. xiv. fig. 3.

Character.—Zoarium arborescent, constituted of thick, erect, chitinous, jointed, branching stems, arising from tubular stoloniform fibres. The deciduous polypides (or

[1] *Zeitschr. f. wiss. Zool.*, Bd. xx. p. 13.
[2] Leidy, *Journ. Acad. Nat. Sci. Philad.*, 1884, vol. ix. p. 12.
[3] *Loc. cit.*, vol. xiii. p. 364.
[4] *Loc. cit.*, p. 14.

calices, Auctt.) are seated on the upper end of slender tubes or pedicels, which are produced into a single or double point on one side at the top; at its base the pedicel dilates into a thick barrel-shaped cylinder (Pl. IX. fig. 7), which is covered by a transparent, ringed, chitinous envelope (Pl. X. fig. 1), lined with a strong muscular layer, the cavity being occupied by a very delicate fibro-cellular tissue (Pl. IX. fig. 14). The chitinous pedicels have four more or less regular longitudinal series of funnel-shaped perforations. These polypiferous peduncles are seated in a cup-shaped hollow, and attached by a much restricted termination in a spiral direction around the upright stems, communication with the interior of which is maintained through a fine funnel-shaped orifice (Pl. XI. figs. 12, 13). The polypides are of the usual pedicelline character, and have a very short flexible stalk, which is attached just within the upper edge of the chitinous pedicels, and when young is continuous with the inner cellular tissue; when mature the polypides appear to be quite cut off from the pedicels on which they are placed, and from which they bud in succession (Pl. IX. fig. 5). The tentacles vary in number from twenty in a bud to twenty-six or twenty-eight in an adult, and are arranged more or less bilaterally and symmetrically. The pedicels and stems are of a bright light brown colour usually; the stems turning nearly black when old. The polypides are white and the barrels white or nearly so, the transparent chitinous envelope being so thin that the white inner layer shows through.

The total length of the calyx and peduncle is 3·5 to 3·8 mm. The polypide measuring about 0·65 × 0·5 mm., the pedicel 2·3 × 0·07 mm., and the barrel 0·75 × 0·5 mm.

Habitat.—Station 163A, off Twofold Bay, 150 fathoms.

[Port Philip Heads.]

The arborescent growth of this beautiful species distinguishes it at once from all other known Pedicelline forms, but the rest of its structure leaves no doubt as to its belonging to that order.

At first sight it is difficult to observe that the tentacles are not arranged in a perfectly regular and continuous circle, but here and there indications may be noticed that a wider space does occur between two at opposite sides of the circumference, viz., at the two ends of the symmetrical plane of the animal; the bilateral arrangement is most clearly seen in a young budding Polypide (Pl. X. fig. 2) which appears closely to resemble the figures given by Hatschek[1] in his paper on *Pedicellina echinata*, and also the figure and description by Salensky.[2] The buds arise in succession spirally and somewhat in pairs (Pl. X. fig. 1) round the growing ends of the chitinous stems and branches. Fresh polypides also bud from the ends of the pedicels after others have died and dropped off; that this also occurs in *Pedicellina* has been noticed and described by Salensky,[3] and

[1] *Zeitschr. f. wiss. Zool.*, Bd. xxix. pl. xxx. figs. 39, 40, 45. [2] *Ann. d. Sci. Nat.*, sér. 6, t. v. p. 36, pl. xv. fig. 36.
[3] *Loc. cit.*, pp. 30, 31.

is mentioned by Professor Leidy[1] as occurring in *Urnatella*, but I have not found it referred to by any other writers on the Pedicellinea.

Pl. X. fig. 1, represents a group of buds at the end of one of the branches, and also shows the barrel-shaped expansion at the base of one of the peduncles, from which the transparent ringed covering has been partially loosened and torn off by the process of boiling. Figs. 3 to 5 on the same plate are taken from sketches made by the late Sir C. Wyville Thomson when the specimens were fresh and alive.

(2) *Ascopodaria discreta*, n. sp. (Pl. X. figs. 6–12).

Character.—The zoarium consists of a creeping stoloniferous stem, jointed at intervals where the branches are given off or where the polypides arise. The deciduous polypides are seated at the upper end of slender chitinous pedicels, which are dilated below into barrel-shaped cylinders that have a thick, ringed, chitinous envelope, and exactly resemble those of the preceding species. The polypiferous peduncles are seated by a broad base on the stoloniform stems; usually singly on the somewhat expanded jointed bifurcation of four branches (fig. 11), but sometimes scattered along the stolons (fig. 12). The chitinous pedicels are irregularly punctured by minute funnel-shaped pores. The polypides are united to the pedicels by a spirally ringed flexible joint (fig. 12). The tentacles are from sixteen to twenty in number. The pedicels and stolons are of a bright brown, horny colour, the polypides white, and the barrels also white or very light brown, appearing darkest when quite young, the chitinous envelope becoming thinner and more transparent as the animal grows older.

The total length varies considerably, apparently according to age; the majority of the older ones measure as much as from 4·25 to 4·4 mm. The polypide being about 0·5 × 0·4 mm., the pedicel 3·0 × 0·6 mm., and the barrel 0·7 × 0·24 mm. This species is, therefore, on the whole, taller and more slender than the preceding one.

Habitat.—Station 135, off Nightingale Island, Tristan da Cunha, 100 to 150 fathoms.

There were very few specimens in all of this species in the collection, and, therefore, it has not been possible to enter into a full and minute examination of the polypide, but it appears to present all the usual Pedicelline characters.

[1] *Journ. Acad. Nat. Sci. Philad.*, vol. ix. pt. i. p. 13.

INDEX.

GENERA, SPECIES, AND VARIETIES.

(Synonyms printed in *italics*.)

	PAGE
Actinopora,	25
ADNATA seu DECUMBENTIA,	21
Alcyonidiidæ,	30
Alcyonidium,	31
flustroides,	31
ALCYONIDULÆ,	30
Alcyonium,	31
Alecto,	22
granulata,	22
parasitica,	22
Amathia,	33
bicornis,	34
brasiliensis,	34
connexa,	35
distans,	33
lendigera,	33
semispiralis,	36
spiralis,	34
tortuosa,	34
ARTICULATA seu RADICATA,	1
Ascopodaria,	41
discreta,	44
fruticosa,	42
Aulopora,	22
Auloporina,	1
Avenella,	38
Barentsia,	41
Berenicea,	24
Bicrisia,	2
Caveidæ,	25
Cellaria,	2
artica,	4
denticulata,	4
Cellaria—continued.	PAGE
eburnea,	4
Cellularia,	2
eburnea,	4
Centrifugines,	1
Centrifuginés empâtés à cellules non operculées,	8
Centrifuginés radicellés,	32
Cerioporа,	22
Cerioporidæ,	26
Cerioporina,	1
Cerioporinæ,	26
Corallium,	15
Corymbopora,	27
Corymbosa,	27
ramosa,	27
Crisia,	9
Crisia,	2
acropora,	6
acuminata,	5
biciliata,	3
conferta,	7
cylindrica,	7
denticulata,	4
var. gracilis,	5
var. patagonica,	5
eburnea, var. laxa,	4
elongata,	5
holdsworthii,	6
luxata,	4
CRISIADÆ,	1
Crisidæ,	1
Crisidea,	1
Crisidia,	2

	PAGE
Crisieæ,	1
Crisies, Les,	1
Crisiidæ,	1
Crisina,	9
hochstetteriana,	11
CTENOSTOMATA,	30
CYCLOSTOMATA,	1
Cycloum,	31
CYLINDRŒCIDÆ,	38
Cylindrœcium,	38
papuense,	38
Defrancia,	25
Diastopora,	9, 22
Diastopora,	24
patina,	24
Diastopores simples,	24
DIASTOPORIDÆ,	24
Discocavea,	25
Discopora,	25
hispida,	26
Discoporadæ,	25
Discoporella,	25
fimbriata,	26
hispida,	26
Discoporellidæ,	25
Discosparsa marginata,	24
patina,	24
Entalophora,	18
anomale,	19
attenuata,	19
deflexa,	20
haastiana,	19
icaunensis,	19
proboscidea,	19
raripora,	19
ENTOPROCTA,	40
ERECTA,	8
Eucratea,	2
Falcaria,	2
Farrella,	38
Farrella,	37
atlantica,	37
Fasciculinea,	26
Fasciculipora,	28
Fasciculipora,	27
digitata,	29
ramosa,	27
Fascigeridæ,	26
Filicrisia,	2

	PAGE
Frondipora,	27
ramosa,	27
FRONDIPORIDÆ,	26
Fungella,	27
prolifer,	27
HALCYONELLEA,	30
Halcyonellæ,	30
Halodactylus,	31
Heteroporella,	25
radiata,	26
hispida,	26
Hornera,	14
affinis,	15
andegavensis,	15
borealis,	15
foliacea,	17
frondiculata,	15
lichenoides,	15
radiata,	10
serrata,	15
tubulosa,	15
violacea,	16
Horneridæ,	8
Idmonea,	9
angustata,	10
atlantica,	10
australis,	12
coronopus,	10
eboracensis,	12
fissurata,	14
marionensis,	11
milneana,	13
irregularis,	14
radians,	10
transversa,	13
Idmoneadæ,	8
IDMONEIDÆ,	8
INARTICULATA,	8
Incrustata,	8
Lagenella,	37
Laguncula,	37
Laomedea,	36
Lichenopora,	25
fimbriata,	26
hispida,	26
LICHENOPORIDÆ,	25
Madrepora,	25
Millepora,	14
lichenoides,	15

	PAGE
Millepora—continued.	
tubipora,	15
Millépores à cellules,	1
Myrioporina,	1
Nit Coralline,	33
Patinella,	24
verrucaria,	24
patina,	24
Pedicellina,	41
Pedicellinæ,	40
PEDICELLINEA,	40
PEDICELLINIDÆ,	40
Pedicellinopsis,	41
fruticosa,	42
Phalangella,	22
flabellaris,	23
phalangea,	23
Polypiaria pedicellinea,	40
Polyzoa carnosa,	30
Proboscina,	22
Pustulipora,	18
proboscidea,	19
deflexa,	20
Pustulopora,	18
clavata,	20
deflexa,	20
orcadensis,	16
proboscidea,	19
proboscidioides,	19
regularis,	21
subverticillata,	21
virgula,	19
Radicellata,	1
Retepora,	9, 14
radians,	10
Retihornera,	16
foliacea,	17
dentata,	17
plicata,	17
Sarchochitum,	31
Serialaria,	33
lendigera,	33
convoluta,	34
semispiralis,	36
spiralis,	34
Sertolara d'avorio, La,	4
Sertolara lendinosa, La,	33
Sertularia,	2, 33, 36
eburnea,	4

	PAGE
Sertularia—continued.	
lendigera,	33
Sparsidæ,	21
Stolonifera,	32
Stomatopora,	22
deflexa,	20
granulata,	22
Supercytis,	28
digitata,	29
tubigera,	29
Syphodictyum,	14
Tervia,	13
folini,	14
Tibiana,	2
Tubigeridæ,	8, 25
Tubipora flabellaris,	23
serteus,	23
Tubulipora,	9, 18, 22, 24, 25
Tubulipora,	22
deflexa,	20
fimbria,	23
fimbriata,	23
flabellaris,	23
hispida,	26
patina,	24
phalangea,	23
verrucaria,	23
TUBULIPORIDÆ,	21
Tubuliporidæ,	8, 24
Tubuliporiens, Les,	8
Tubuliporina,	1
Unicavea,	25
Unicellaria,	2
Unicrisia,	2
Valkeria,	33, 36
lendigera,	33
Valkeriidæ,	32
Vesicularia,	38
Vesicularia,	36
papuensis,	36
trichotoma,	37
Vesicularia dæ,	32
VESICULARIDÆ,	32
Vesicularieæ,	32
Vesicularieæ,	32
Vesicularidæ,	32
VESICULARINA,	32
Vesicularina,	30

PLATE I.

PLATE I.[1]

CRISIA.

		Diam.	Page
Figures 1, 2.—*Crisia biciliata*, natural size,			3
	1*a*, front; 1*b*, back; 1*c*, œcium; 2*a*, side view,	× 50	
„ 3.—*Crisia elongata*,			5
	3*a*, part of the zoarium, front view,	× 25	
„ 4.—*Crisia denticulata*, var. *gracilis*,			5
	4*a*, part of the zoarium, front and back; 4*b*, œcium; 4*c*, occasional mode of attachment to a sponge spicule; 4*d*, terminal process,	× 25	

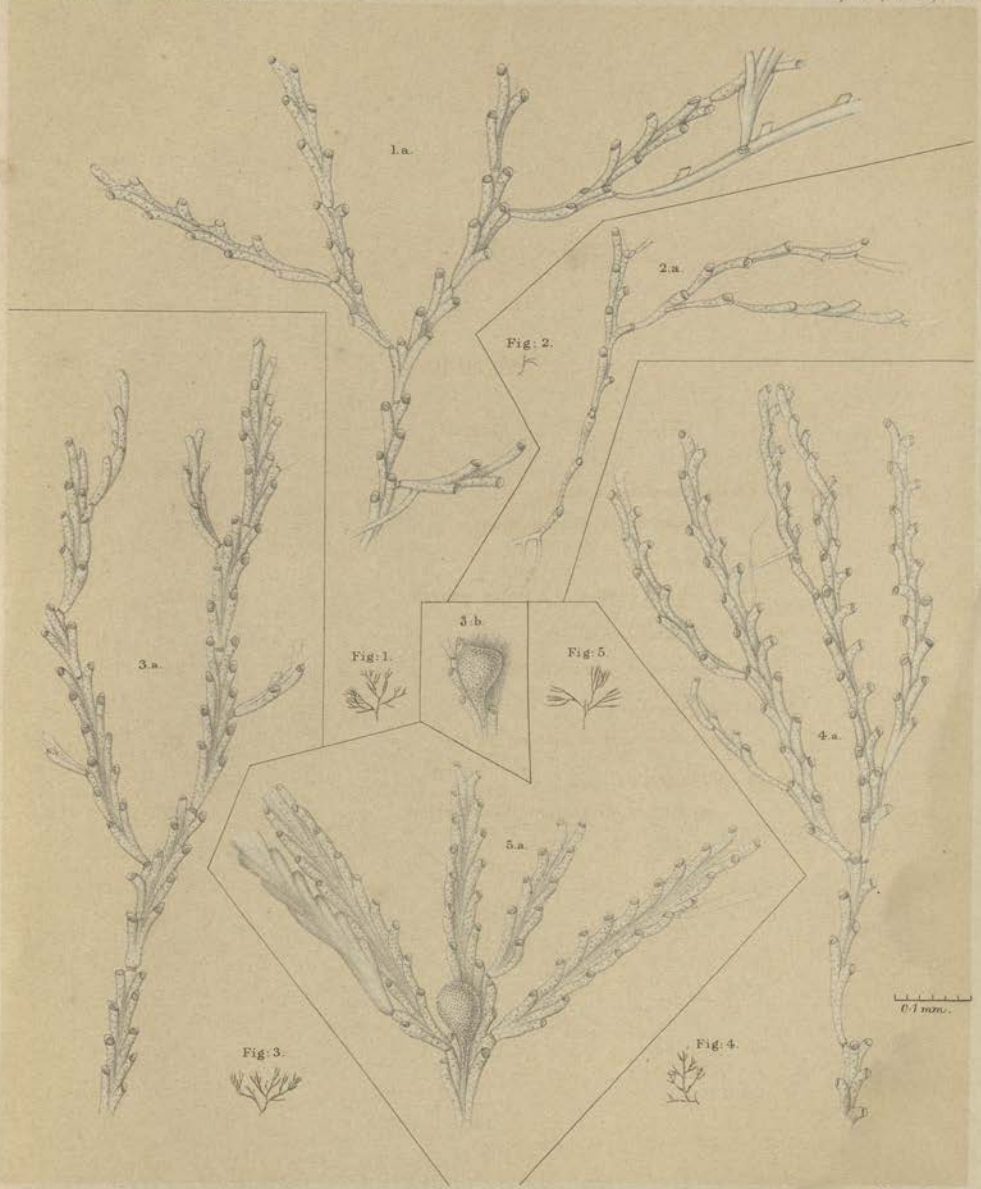
[1] A scale in millimetres is marked near the lower right-hand corner of Plates I.–VIII., which applies to all the figures on each, except where a different scale is marked.

1a.
1b.
1c.
0·1 mm.
Fig. 1.
Fig. 2.
3a.
Fig. 3.
2a.
0·1 mm.
4b.
4a.
Fig. 4.
4c.
4d.
0·1 mm.
0·1 mm.

PLATE II.

Crisia.

		Diam.	Page
Figure 1.—*Crisia eburnea.* var. *laxa*,			4
	1*a*, part of the zoarium, front,	× 25	
„ 2.—*Crisia cylindrica*,			7
	2*a*, lower portion of a young zoarium,	× 25	
„ 3.—*Crisia denticulata*,			4
	3*a*, front; 3*b*, œcium,	× 25	
„ 4.—*Crisia cylindrica*,			7
	4*a*, older part of zoarium, front,	× 25	
„ 5.—*Crisia conferta*,			7
	5*a*, part of the zoarium, with œcium,	× 25	



G.B. del. C.Berjeau lith.

CRISIA.

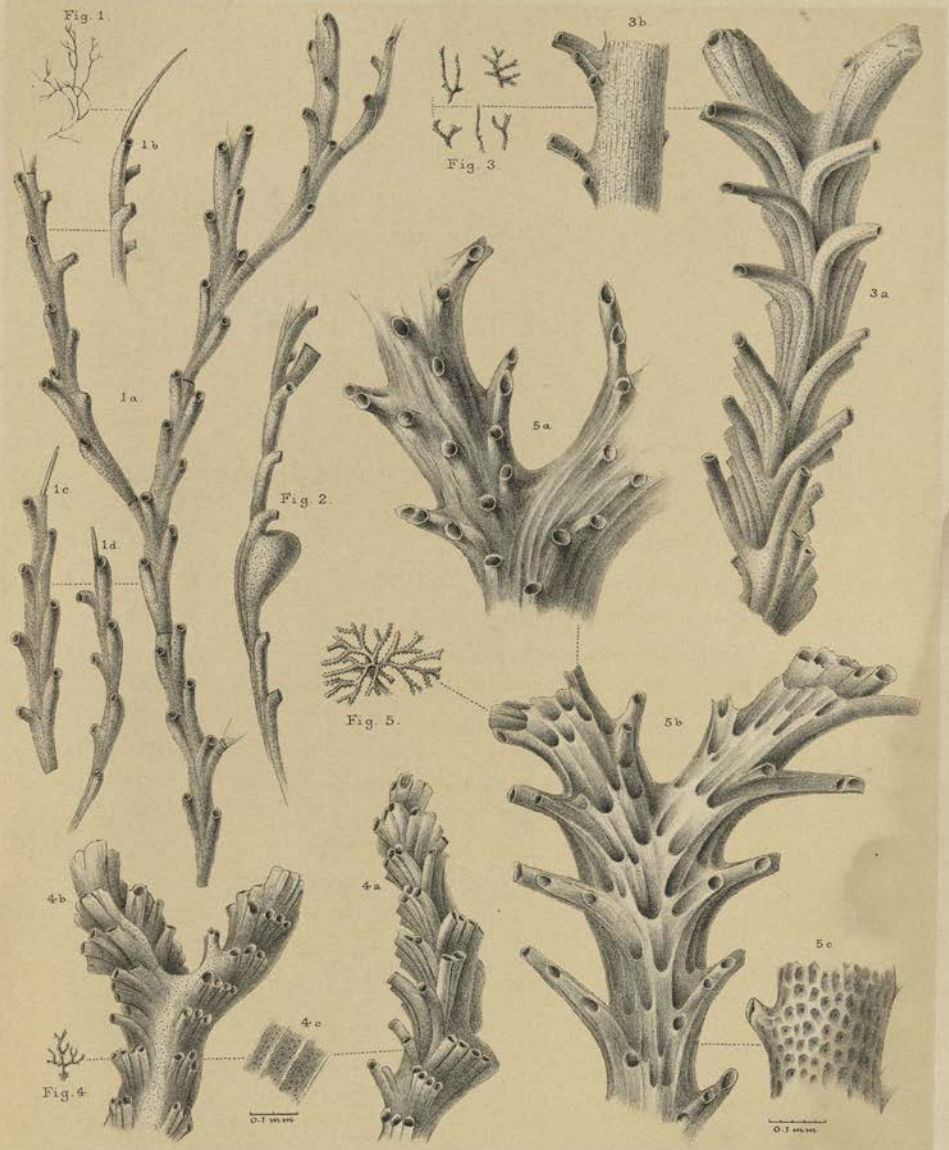
Mintern Bros. imp.

PLATE III.

PLATE III.

CRISIA.—IDMONEA.

		Diam.	Page
Figure 1.—*Crisia acuminata*, ...			5
1*a*, part of a branch, front view; 1*b*, 1*c*, 1*d*, terminal processes, ...	×	25	
,, 2.—*Crisia holdsworthii*, œcium, ...	×	25	6
,, 3.—*Idmonea australis*, ...			12
3*a*, front; 3*b*, back, ...	×	25	
,, 4.—*Idmonea eboracensis*, ...			12
4*a*, front; 4*b*, œcial dilatation, . . .	×	25	
4*c*, back, ...	×	50	
,, 5.—*Idmonea fissurata*, ...			14
5*a*, front of young portion of zoarium; 5*b*, older part; 5*c*, back, ...	×	25	



J.B. del.

Geo. West & Sons lith. et imp.

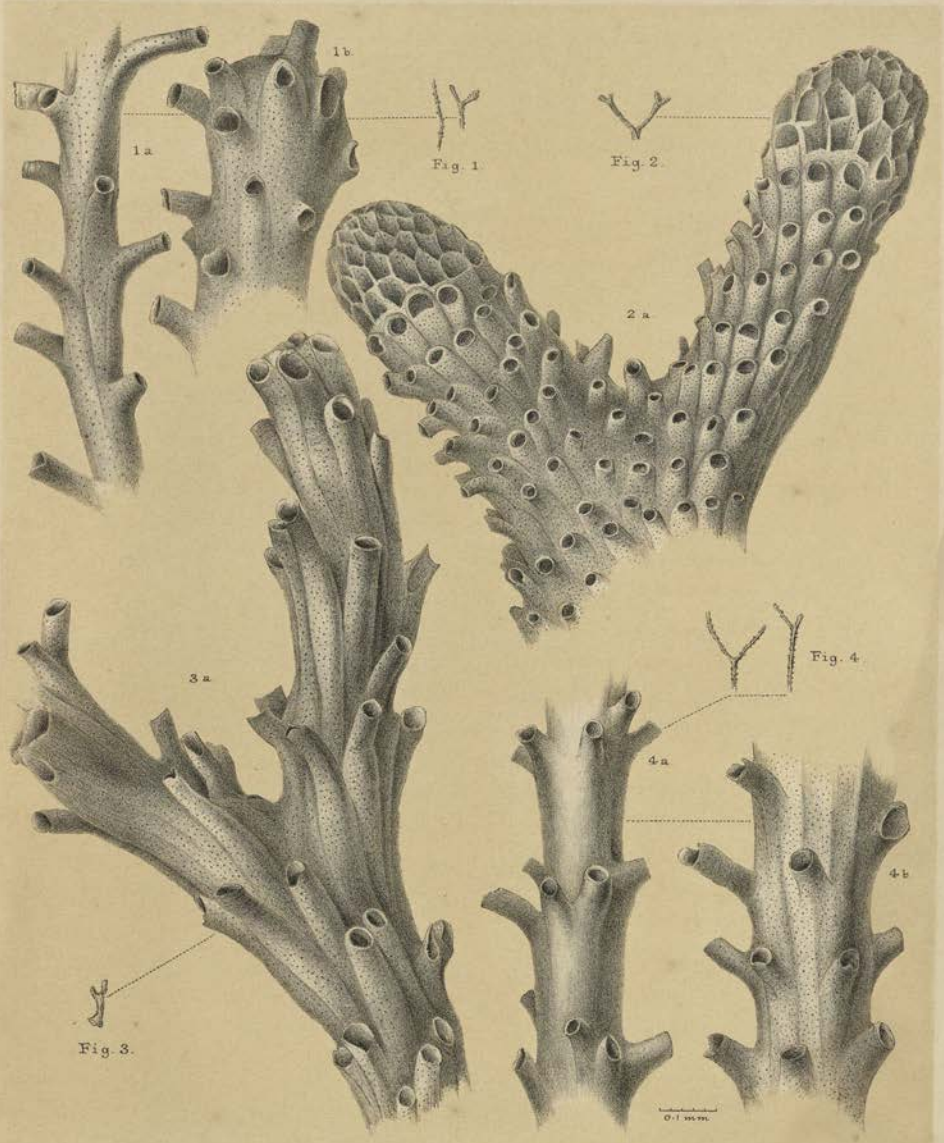
CRISIA, IDMONEA.

PLATE IV.

PLATE IV.

PUSTULOPORA.

		Diam.	Page
Figure 1.	*Pustulopora proboscidea*, ...		19
	1*a*, part of zoarium; 1*b*, œcial dilatation, . .	× 25	
„ 2.	*Pustulopora regularis*, ...		21
	2*a*, terminal fork, ...	× 25	
„ 3.	*Pustulopora deflexa*, ...		20
	3*a*, bifurcation of zoarium, ...	× 25	
„ 4.	*Pustulopora proboscidioides*, ...		19
	4*a*, 4*b*, two portions of the zoarium, . . .	× 25	



J.B. del. Geo. West & Sons, lith. et imp.

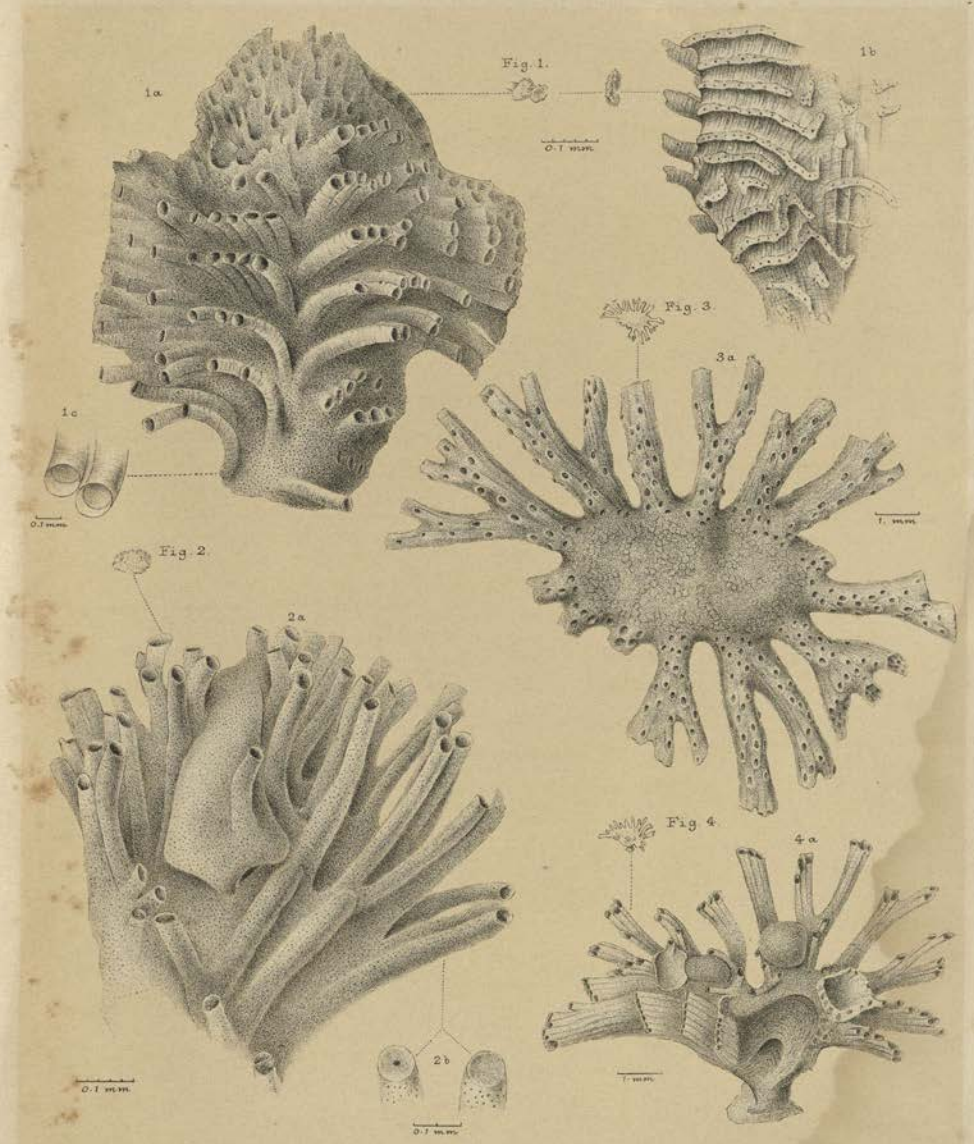
PUSTULOPORA.

PLATE V.

PLATE V.

TUBULIPORA.—SUPERCYTIS.

		Diam.	Page
Figure 1.—*Tubulipora flabellaris*,			23
1*a*, front; 1*b*, back,	×	25	
1*c*, orifice,	×	50	
„ 2.—*Tubulipora fimbria*,			23
2*a*, front, with œcium,	×	25	
2*b*, orifice,	×	50	
„ 3.—*Supercytis digitata*,			29
3*a*, the zoarium,	×	9	
„ 4.—*Supercytis tubigera*,			
4*a*, the zoarium, with œcia,	×	9	29



G.B. & J.B. del.

Geo. West & Sons lith. et imp.

TUBULIPORA, SUPERCYTIS.

PLATE VI.

AMATHIA.

		Diam.	Page
Figure 1.—*Amathia tortuosa*,			34
	1*a*, part of a branch; 1*b*, showing the exserted neck,	× 25	
„ 2.—*Amathia spiralis*,			34
	2*a*, 2*b*, portions of the zoarium,	× 25	
„ 3.—*Amathia connexa*,			35
	3*a*, part of the zoarium; 3*b*, another part, showing the commencement of a branch,	× 25	

J.B. & F.B. del. Geo. West & Sons lith. et imp.

AMATHIA.

PLATE VII.

PLATE VII.

AMATHIA.—FARRELLA.

		Diam.	Page
Figure 1.—*Amathia distans*,			33
	1*a*, part of the zoarium,	× 25	
	1*b*, young spiral not fully developed; 1*c*, showing exserted necks,	× 50	
	2.—*Amathia brasiliensis*,		34
	2*a*, 2*b*, portions of the zoarium; 2*c*, long, barren-jointed, terminal filaments; 2*d*, 2*e*, occasional scattered zoœcia,	× 25	
,, 3, 3*a*.—*Farrella atlantica*,		× 50	37
	3*b*, 3*c*, zoœcia with polypides; 3*d*, with quadrangular orifice; 3*g*, young zoœcium,	× 110	
	3*e*, 3*f*, different forms of zoœcia,	× 50	

G.B. & J.B. del.

Geo. West & Sons lith. et imp.

AMATHIA, FARRELLA.

PLATE VIII.

PLATE VIII.

AMATHIA.—VESICULARIA.—CYLINDRŒCIUM.

		Diam.	Page
Figure 1.—*Vesicularia papuensis*,			36
	1*a*, part of the zoarium,	× 25	
	1*b*, zoœcia with polypides,	× 110	
	1*c*, bifurcation of the zoarium,	× 50	
„ 2.—*Cylindrœcium papuense*,		× 25	38
„ 3.—*Amathia semispiralis*,			36
	3*a*, part of the zoarium : 3*b*, young growing end,	× 25	
„ 4.—*Vesicularia trichotoma*,			37
	4*a*, magnified,	× 25	
	4*b*, zoœcium and buds,	× 50	

G. B. del.

Geo. West & Sons lith. et imp.

AMATHIA, VESICULARIA, CYLINDRŒCIUM.

PLATE IX.

PLATE IX.[1]

ASCOPODARIA.

		Diam.	Page
Figure	1.—*Ascopodaria fruticosa,* natural size, ...		42
„	2.—A single zoœcium and polypide, ...	× 25	
„	3.—A single polypide, with the tentacles coiled within the open edge of the cup, ...	× 50	
„	4.—Another polypide, with the edge of the cup contracted, ...	× 50	
„	5.—A young polypide budding from the end of an old pedicel, ...	× 50	
„	6.—A single polypide, showing the visceral organs, .	× 110	
„	7.—Barrel-shaped expansion at the base of a pedicel, .	× 50	
„	8, 9.—Longitudinal sections through a polypide, . .	× 110	
„	10.—Portion of stem, with bases of peduncles, . .	× 25	
„	11.—Longitudinal section of stem, ...	× 50	
„	12, 13.—Transverse sections of stem, ...	× 50	
„	14.—Portions of the parenchymatous tissue, from the centre of the stem, ...	× 360	

[1] Several references used on this plate:—*i*, intestine; *l*, liver cells; *œ*, œsophagus; *om*, ovarian masses; *r*, rectum; *s*, stomach; *t*, tentacles.

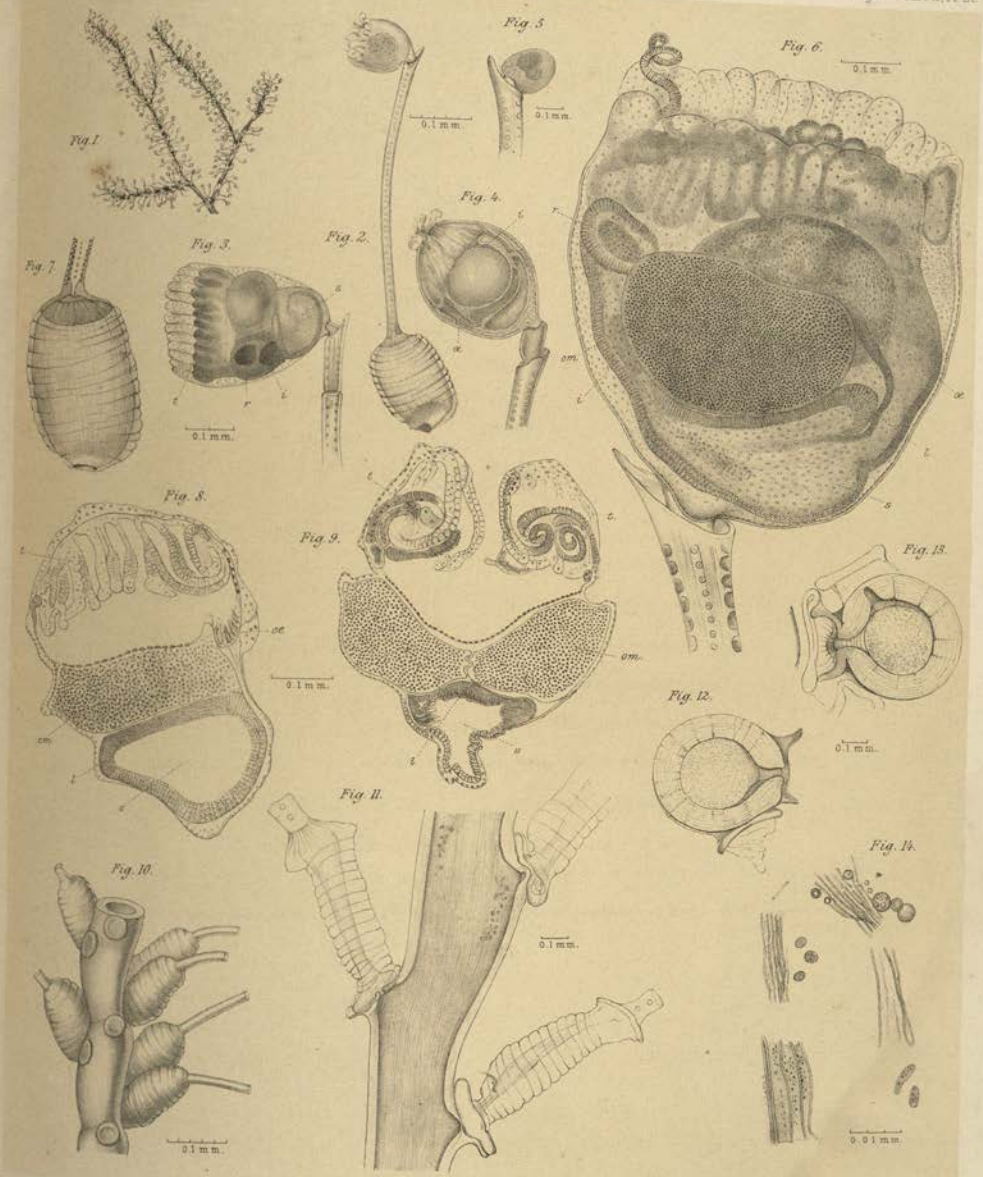


Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
Fig. 11.
Fig. 12.
Fig. 13.
Fig. 14.
0.1 mm.
0.01 mm.

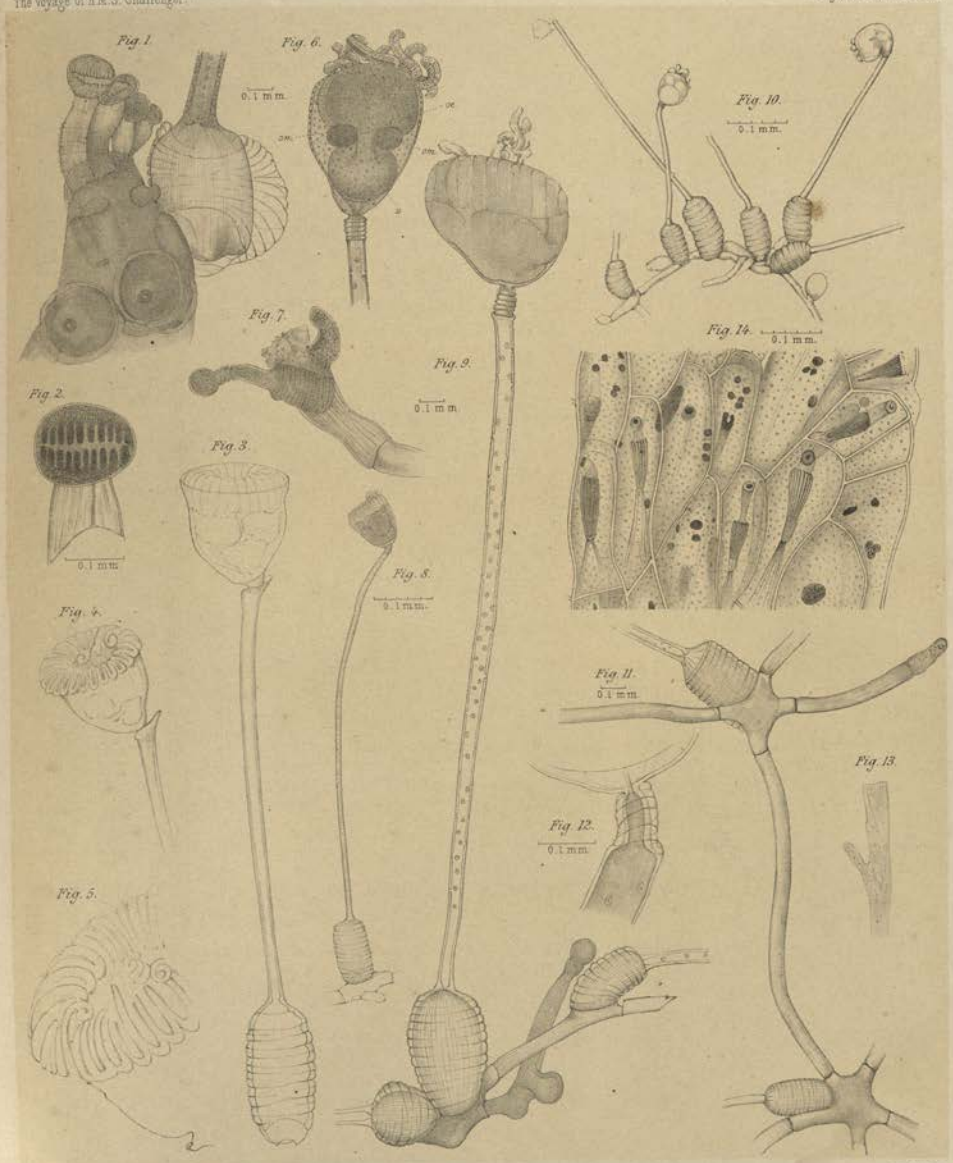
PLATE X.

PLATE X.[1]

ASCOPODARIA.—ALCYONIDIUM.

		Diam.	Page
Figure	1.—*Ascopodaria fruticosa*, group of young buds at the end of a branch, also showing the transparent envelope of a barrel which has been partially torn off, and the cup-like sockets in which the peduncles are seated, ...	× 50	43
	2.—A single bud, showing the bilateral arrangement of the tentacles, ...	× 110	
,,	3, 4, 5.—After sketches of the same, taken when fresh by the late Sir C. Wyville Thomson, ...		
,,	6.—*Ascopodaria discreta*, a single polypide, . . .	× 50	44
,,	7.—Two buds at the end of a stolon, ...	× 50	
,,	8.—A single zoœcium and polypide, ...	× 25	
,,	9.—A single zoœcium, also showing stolon and buds, .	× 50	
,,	10.—A group of zoœcia, ...	× 25	
,,	11.—Stolon with bud and the base of two peduncles, .	× 50	
,,	12.—The spirally ringed segment by which the polypide is attached to the pedicel, ...	× 110	
,,	13.—*Alcyonidium flustroides*, ...		31
,,	14.—Portion of the zoarium, with scattered ova and "brown bodies,"	× 25	

[1] Several references used on this plate:—*i*, intestine; *l*, liver cells; *œ*, œsophagus; *om*, ovarian masses; *r*, rectum; *s*, stomach; *t*, tentacles.



C.W.T., G.B. & J.B. del.

J. Huth, Lith. Edin.

ASCOPODARIA, ALCYONIDIUM.

00142601

Digitized with financial assistance from the
Government of Maharashtra
on 02 July, 2018